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May 14, 2002

Mr. Roy Crossland
START Project Officer
U.S. Environmental Protection Agency
901 North 5th Street
Kansas City, Kansas 66101

**Subject: Hazard Ranking System (HRS) Scoring Evaluation
Agromac-Lockwood Operating Unit Number 2, Gering, Nebraska
EPA Region 7 START 2, Contract No. 68-S7-01-41, Task Order No. 0008.10
Task Monitor: Kevin Larson, On-Scene Coordinator**

Dear Mr. Crossland:

Tetra Tech EM Inc. (Tetra Tech) Superfund Technical Assessment and Response Team is submitting the attached HRS Scoring Evaluation for the above-referenced site. If you have any questions or comments regarding this report, please call the project manager at (913) 495-3945.

Sincerely,

Adam G. Hodge for Jeff Hodge

Jeff Hodge
START Project Manager

For Hieu Q. Vu

For Hieu Q. Vu, PE, CHMM
START Program Manager

Enclosure

cc: File



R00418387

RCRA RECORDS CENTER



**HRS SCORING EVALUATION FOR
AGROMAC-LOCKWOOD OPERATING UNIT NUMBER 2 SITE, GERING, NEBRASKA**

Superfund Technical Assessment and Response Team (START) 2

Contract No. 68-S7-01-41, Task Order No. 0008.10

Prepared For:
U.S. Environmental Protection Agency
Region 7
901 North 5th Street
Kansas City, Kansas 66101

May 14, 2002

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1.0 INTRODUCTION

Tetra Tech EM Inc. (Tetra Tech) Superfund Technical Assessment and Response Team (START) has prepared a revised Hazard Ranking System (HRS) score for the Agromac-Lockwood Operating Unit 2 (Agromac) Site, under Task Order No. 0008.10, Contract No. 68-S7-01-41. This scoring evaluation was prepared for the Agromac site using information gathered by START during the Site Reconnaissance and File Review Activities (Tetra Tech 2001), the Removal Assessment (RA) (Tetra Tech 2002) conducted in 2002 and previous investigations conducted at the site. Previous investigations include multiple Compliance Evaluation Inspections (CEI) conducted between 1982 and 1999 by the U.S. Environmental Protection Agency and the Nebraska Departments of Environmental Conservation (NDEC) and its successor the Nebraska Department of Environmental Quality (NDEQ). Also used in this site scoring were a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) conducted at this site in 1987, a RCRA Facility Investigation (RFI) conducted in phases from 1992 to 1994, and a groundwater investigation conducted by the U.S. Geological Survey (USGS) in 1999. Additional groundwater sampling was conducted as part of compliance monitoring at a closed surface impoundment from 1988 to 1998.

The revised HRS score was calculated using the score sheets from the HRS model (U.S. Environmental Protection Agency [EPA] 1990). Sampling efforts during the RA focused on documenting an observed release to the groundwater pathway. There are no on-site or nearby residents; therefore, the score that would be generated on the soil exposure and air migration pathways would be minimal. The surface water migration path was not scored because there was no clearly defined overland flow migration pathway, and the contribution to the site score was minimal. A site score of 50 was calculated using the analytical results of the sampling conducted during the previous investigations and the RA.

2.0 BACKGROUND INFORMATION

This section provides information on the site location, site description, operational history, and previous investigations conducted at the site.

2.1 SITE LOCATION AND DESCRIPTION

The Agromac Site is located 0.5 mile east of Gering, Nebraska (see Appendix A, Figure 1). The geographic coordinates of the site are latitude 41°82'11" north and longitude 103°63'69" west. The site is located on the Scottsbluff South, Nebraska, 7.5-minute quadrangle map, in the southeast quarter of Section 1, Township 21 North, Range 55 West (USGS 1963). The street address of the site is 220759 Highway 92, Gering, Nebraska.

The site is located on 80 acres in an industrial park and is bounded to the north by Nebraska Highway 92, to the east by several private residences, to the south by farmland, and to the west by a rail spur and additional industrial facilities. The property has been used by several different corporations to manufacture farm machinery and irrigation equipment. Currently, no manufacturing operations are being conducted at the site. The main warehouse in the northern portion of the site is being leased by the Western Sugar Company for storage of raw sugar and packaging materials. The entire 80-acre site is owned by Agromac International, Inc. (AII), except for 3 acres owned by the City of Gering for use as an electrical substation and a closed, 1-acre surface impoundment still owned by Lockwood Industries, Inc. (LII). A site location map is provided showing site features, including the location of the manufacturing buildings and suspected source areas (see Appendix A, Figure 2).

2.2 SITE HISTORY

The site was first developed for industrial use in 1963 when farm equipment manufacturing and the production of central pivot irrigation systems was started by LII (Sorensen 1997a). Operations in the galvanizing building in the southern portion of the property began in 1972. LII notified EPA on August 13, 1980, that it was a treatment, storage, and disposal facility for flammable and corrosive characteristic wastes D001 and D002, as defined under RCRA (Nebraska Department of Environmental Conservation [NDEC] 1986a).

On March 3, 1984, a CEI was conducted by NDEC. Inspectors observed a leak in a surface impoundment where the influent pipe had eroded the liner and waste acid had leaked into the surrounding soil (HWS Technologies Inc. [HWS] 1989). As a result of this CEI, NDEC issued an Administrative Order for LII to cease using surface impoundments in June 1984 (EPA 2001a). In August 1984, a preliminary hydrogeologic investigation at the surface impoundments was completed by

HWS. In October 1985, 10 monitoring wells were installed in the vicinity of the closed surface impoundments (HWS 1989). The location of all monitoring wells installed at the site are shown in Appendix A, Figure 3. Closure of the surface impoundments was conducted in November 1986 (HWS 1989). Currently, the trustee for the LII is continuing to perform long-term postclosure compliance monitoring at selected groundwater wells around the impoundments.

In 1987, an RFA was conducted by an EPA contractor at the facility and several Solid Waste Management Units (SWMU) were sampled (EPA 1988).

A Hazardous Waste Post-Closure Permit was issued by NDEC in September 1989, which stipulated post-closure maintenance of the impoundments, groundwater monitoring, and required an RFI to define the extent of releases from regulated units (Sorenson 1997a).

The RFI was conducted in several phases by a facility contractor, with soil and groundwater sampling conducted from 1992 through 1994. Elevated levels of zinc were detected in soil in the raw product storage area, and elevated levels of zinc and lead were detected in soils in the waste oil storage area (ENSR Consulting and Engineering [ENSR] 1993, 1994). Three monitoring wells near the center of the site contained tetrachloroethene (PCE) and trichloroethene (TCE) (ENSR 1994). A final RFI report was not prepared, because the facility contended that they never received EPA comments (Sorensen 1997a).

In 1994 LII ceased operations in the galvanizing plant. Zinc and iron sulfate crystals from the beta acid reclamation system and galvanizing sludge generated by LII were stored in drums and placed in the pits located in the galvanizing building for storage prior to off-site transport and disposal (Sorensen 1997a). LII ceased operation entirely in December 1995 and filed for bankruptcy.

In February 1996, AII purchased the entire property, except for the 1.09-acre site of the closed surface impoundments, which is still owned by the trustees of the former LII, and the 3-acre electrical substation owned by the City of Gering (EPA 1998). Also in February 1996, AII sold the irrigation pipe business to Powerhorse Lockwood Irrigation Company (Powerhorse) (EPA 1998). AII leased 25 acres of the site, including the galvanizing facility, to Powerhorse.

On November 11, 1995, and again on January 8, 1996, a pipe burst, flooding the pits and the drums stored there with water (EPA 2000b). AII contracted Consolidated Industrial Services (CIS) to remove

these materials from the pit and clean up the surrounding area (Sorensen 1997a). Fifty-five thousand gallons of water were pumped from the sump and treated (CIS 1996). The water in the sump prior to treatment was acidic (pH of 0.8) and contained concentrations of cadmium and chromium that exceeded RCRA Toxicity Characteristic Leaching Procedure (TCLP) thresholds for hazardous waste (CIS 1996). Lead and zinc also were detected in the wastewater. The wastewater was neutralized on site and disposed of as nonhazardous waste. Two hundred and thirty-four cubic yards (yd³) of wastewater treatment sludge generated during neutralization also were disposed of off site as nonhazardous waste (CIS 1996).

NDEQ issued a letter on September 3, 1996, indicating that a closure plan was required for the galvanizing pit area because hazardous wastes had been stored in this unit for over 90 days. On May 12, 1997, NDEQ followed this letter with a Letter of Warning, indicating that AII had not filed a closure plan (Sorensen 1997a). A closure plan for this area does not appear ever to have been filed by the facility.

Powerhorse resumed galvanizing operations and proceeded to implement improvements to the metal treatment and galvanizing pits without the knowledge or consent of AII or NDEQ in fall 1996 (Sorensen 1997a). Powerhorse removed firebrick and leveling sand from the metal treatment and galvanizing pits, excavating them to the original concrete floor. A new liner was placed on the concrete, and another layer of concrete was placed over the liner. The leveling sand and fire brick was deemed to be RCRA characteristic hazardous waste for lead (D008) and had a pH of 0.9 (EPA 2000a). An unspecified hazardous waste landfill received these wastes on January 15, 1997.

In March 1999, Powerhorse shut down the galvanizing operation and abandoned a number of process chemicals in the metal treatment and galvanizing pits. Powerhorse entered into involuntary bankruptcy proceedings under Chapter 7 in April 1999 (EPA 2000a).

Chemicals abandoned by Powerhorse in the galvanizing building included seven large vats filled with various liquids, including two 5,000- to 6,000-gallon tanks filled with sulfuric acid. In addition, a tank on the southern side of the galvanizing building held about 10,000 gallons of sulfuric acid (EPA 2000b). Waste sulfuric acid was left in the spent acid holding pit south of the galvanizing building, and numerous drums of chemicals were abandoned in the chemical storage area in the northwestern corner of the galvanizing building. These wastes were observed during EPA inspections conducted in May 1999 and January 2000 (EPA 2000a).

This abandonment of chemicals constituted illegal storage of hazardous waste under RCRA. On September 9, 1999, Powerhorse wrote to NDEQ requesting an extension of the 90-day waste accumulation period. A letter from NDEQ dated September 22, 1999, denied this request for an extension. NDEQ indicated in the letter that Powerhorse was subject to closure requirements and that the facility had been referred to the EPA Superfund Program (NDEQ 1999). Because of the financial insolvency of Powerhorse, the site was referred to the Region 7 Superfund Program in August 1999.

In February 2000, a water pipe burst in the galvanizing building, again flooding the vats and secondary containment areas (EPA 2000a). An action memorandum requesting a Superfund-led removal action was issued on August 16, 2000 (EPA 2000b).

On December 11, 2000, the EPA on-scene coordinator (OSC) and the emergency response and removal contractor began a Superfund time-critical removal action (TCRA). When they arrived, they encountered seven 5,000-gallon treatment vats inside of the galvanizing building, some of which contained highly acidic and caustic liquids. Five tanker loads of acid (17,000 gallons) and two tanker loads of caustic (8,000 gallons) liquids were removed from the site in December 2000. On June 4, 2001, liquids were pumped out of the spent acid pit south of the galvanizing building for off-site disposal. The empty treatment vats inside of the galvanizing building were then removed. The secondary containment around the treatment vats was used for neutralization of water from the rinse vats. Lime was added to the rinse water. About 30,000 gallons of treated rinse water were discharged to the Gering Public Treatment Works.

2.2.1 Comprehensive Environmental Response, Compensation, and Liability Act Eligibility

Tetra Tech evaluated Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) eligibility as part of this scoring evaluation, using the RCRA site policy guidance (EPA 1992). Typically, the Agromac Site would be subject to RCRA Subtitle C corrective action authority. Such sites may be placed on the National Priorities List (NPL) if they meet any of the following criteria:

- Treatment, storage, or disposal facilities (TSDF) that have demonstrated an unwillingness to undertake corrective actions
- TSDFs that have demonstrated an inability to pay for cleanup, as evidenced by a bankruptcy filing or similar action

- Former TSDFs that did not pursue a RCRA operating permit and have changed their RCRA status to "generator" or "non-handler" (these facilities are sometimes referred to as "convertors")
- RCRA "Non- or Late Filers" (that is, facilities that operated as TSDFs after the statutory deadline but either did not notify EPA or delayed notification).

Based on the site history, it appears that this facility meets three of the above criteria. The facility has avoided performing corrective actions on sumps in the galvanizing building. Two operators at the facility have gone into bankruptcy, and the current owner, AII, is no longer in the manufacturing business and appears to have limited means. LII did apply for a Part B Permit but did not complete the application process. The facility operators "converted" to a generator after operating as an illegal TSDF by storing waste over 90 days on numerous occasions.

2.2.2 Resource Conservation and Recovery Act Compliance Inspections

Numerous CEIs have been conducted at this facility by NDEC, the Nebraska Department of Environmental Quality (NDEQ) (the successor to NDEC), and EPA. From August 18, 1982, to May 6, 1999, at least 13 CEIs have been conducted at the facility. Numerous violations were noted during these inspections. Frequent violations included failure to make adequate waste determinations, failure to close and secure drums, numerous paperwork violations on hazardous waste manifests, and failure to dispose of hazardous waste within 90 days.

2.2.3 Resource Conservation and Recovery Act Solid and Hazardous Wastestreams

Hazardous wastestreams generated and stored on site are discussed in the following section. Observations about the types of hazardous wastes made during CEIs is included to provide attribution for detections of hazardous substances in source and groundwater sampling. During the CEIs, the following major wastestreams were observed:

- Spent pickle liquor, D002, waste sulfuric acid from galvanizing operations. The facility generated 11,000 to 13,000 gallons per month. This waste was stored on site in a 40,000-gallon in-ground pit south of the galvanizing building.
- Spent pickle liquor, D002, waste hydrochloric acid used in the chain production line. The facility generated as much as 400 gallons per week. This waste was stored on site in the 40,000-gallon in-ground pit south of the galvanizing building.

- Waste acid sludge, D002, generated during cleaning of acid dip tanks. The facility generated 150 to 1,500 drums per year, and it frequently stored this waste in drums with open tops in a gravel-covered hazardous waste storage area south of the galvanizing building.
- Caustic sludge, D002, generated during cleaning of caustic dip tanks. The facility generated 4 to 15 drums per year. Although the storage area that used this waste is unknown, it was presumably located at the hazardous waste storage area south of the galvanizing building.
- Spent solvents, D001, generated in parts washers (as many as 13), which were located throughout the facility. The facility generated as much as 1,700 pounds per month. Parts washers were serviced by Safety-Kleen and other commercial contractors. Some inspectors noted that wastes from parts washers were handled as the following RCRA characteristic hazardous wastes: D006 (cadmium), D008 (lead), D018 (benzene), D036 (nitrobenzene), D039 (PCE), and D040 (TCE) (EPA 1998). These waste determinations were made using process knowledge. A report for a CEI conducted by NDEC on June 2, 1986, contained a list of chemicals in use at the facility that included PCE, which was being used as a "safety solvent" (NDEC 1986b).
- Waste methyl ethyl ketone (MEK), xylene, acetone, isopropyl alcohol, and toluene; D001, F003, and F005. These wastes were generated during spray paint equipment cleanup activities. The facility generated as much as 1,330 gallons per month. These materials were stored in (1) hazardous waste storage areas east and south of the main manufacturing building, (2) south of a galvanizing building, (3) satellite accumulation areas, (4) a paint storage area, (5) a solvent recycling area, and (6) open areas south of the solvent recycling area.
- Waste paint sludges, D001, F003, F005, generated in spray paint booths. The facility generated up to 12 drums per month. Analyses of paint sludges conducted in 1984 by NDEC found high concentrations of lead (18,120 milligrams per kilogram [mg/kg]), zinc (8,050 mg/kg), and chromium (3,810 mg/kg) (EPA 1988). In 1997, EPA determined that the paint sludges were characteristic hazardous wastes for chromium (D007), lead (D008), and MEK (D035), based on analyses performed by Safety-Kleen (EPA 1998). This waste was stored in hazardous waste storage areas south and east of the main manufacturing building, south of the galvanizing building, in satellite accumulation areas in the paint storage area, in the solvent recycling area, and in open areas south of the solvent recycling area.
- Waste paint and solvents, D001, F003, and F005; off-specification paint, still bottoms, and unusable solvents generated by spray paint operations. The facility generated as much as 35,500 pounds per year (NDEC 1991). These materials were stored in (1) hazardous waste storage areas south and east of the main manufacturing building, (2) south of the galvanizing building, (3) satellite accumulation areas, (4) the paint storage area, (5) the solvent recycling area, and in open areas south of the solvent recycling area.
- Used oil and spent coolant, RCRA non hazardous; includes quench oils, hydraulic oils, honing oils, motor oil, and spent coolant from machining processes. The facility

generated as much as 500 gallons per month. Coolants were discharged to the municipal sewer and were mixed with waste oils. In 1997, the used oils were placed in a sump at the northeastern corner of the property, where excess water was evaporated prior to disposal by used oil recyclers (EPA 1998). Waste oils also were stored in totes located near the southeastern corner of the galvanizing building, on various hazardous waste storage pads, and in an open area on the southeastern corner of the facility.

- Scrap metal, RCRA non-hazardous; includes zinc skimmings and dross. The facility generated between 10,000 and 20,000 pounds per month. These materials were stored in open areas south of the galvanizing buildings and in various warehouses.
- Beta acid crystals were not considered to be a waste. The beta acid crystals were sold to various companies, including Nutra-Flo, for use as a food additive (EPA 1998). These crystals were generated when impurities were removed from waste acid. The waste acid was piped from the spent acid pit to process tanks that were located in a shed on the southern side of the galvanizing building known as the beta acid shed. The facility generated as much as 25 tons per month. Beta acid crystals were identified as zinc sulfate and iron sulfate heptahydrate, although no analytical data identifying their chemical composition were found in the inspection reports. Beta crystals were allowed to accumulate until the facility had 25 tons of crystals, which were stored in an unspecified warehouse. Beta acid crystals also were sent off site for disposal as non-hazardous waste during a site cleanup conducted in 1996 (CIS 1996). During the RA, the beta acid crystals stored on site were sampled and contained high total concentrations of cadmium (49.3 mg/kg), chromium (650 mg/kg), manganese (2,210 mg/kg), and zinc (147,000 mg/kg) (Tetra Tech 2002). TCLP results indicated that the beta acid crystals exceed the TCLP regulatory limits for characteristic hazardous waste for cadmium and chromium. Mercury concentrations were just below the regulatory threshold, and manganese (75.9 milligrams per liter [mg/L]) and zinc (5,710 mg/L) concentrations were elevated.
- Process waste waters; includes waste waters from the iron phosphate parts washing process, paint line rinse waters, caustic water treatment rinse waters, galvanizing rinse waters, and non contact cooling waters. The facility discharged 22,000 gallons per day to the sanitary sewer. Waste waters from the iron phosphate parts washing process and paint line rinse waters were discharged to Sewer Lines 001 and 002. Rinse water from caustic treatment in the chain production line was discharged to Sewer Line 003, and cooling water and rinse water from the galvanizing area was discharged to Sewer Line 004. In 1987, the facility was in violation of newly promulgated metal finishing pretreatment requirements for discharges to municipal sewers (EPA 1988).
- Metal shavings, not RCRA hazardous. The facility produced as much as 1,000 pounds per month. These were placed in roll-off bins east of the manufacturing building. Staining from oils on the shavings were observed on the ground around the roll-off bins.
- Burn pit ash, not RCRA hazardous, based on analytical data furnished to an EPA inspector. A total of thirty yd³ were generated by burning trash and debris (EPA 1988). The facility disposed of the material at the Gering municipal landfill. The burn pit was located in an open area on the eastern side of the facility (see Appendix A, Figure 2).

2.2.4 Suspected Waste Management Units

During the CEIs, the following SWMU were observed:

- A 40,000-gallon, in-ground tank, with no secondary containment, was used to store acid wastes from sulfuric acid and hydrochloric acid process tanks.
- Up to 13 parts washers were used throughout facility, mostly in the northern manufacturing warehouse.
- Beta acid crystals were stored in an open area due south of the galvanizing building in 1991 and later were moved to a salvage materials warehouse along the eastern edge of the facility property. Beta acid crystals were stored in the northwestern corner of the salvage materials warehouse.
- Beta acid crystals and waste materials from process clean-out operations were stored in the beta acid recycling facility, the galvanizing plant, open areas south of the galvanizing plant, and the salvage warehouse, frequently without labels or waste determinations.
- Zinc dross, skimmings, and galvanizing kettle ash were stored in the open areas south of the galvanizing building during many inspections. They also were stored in the northwestern corner of the salvage materials warehouse.
- A burn pit, located northeast of the galvanizing building, was being used for disposal of solid waste, including wood, paper, plastic, and food scraps, by open burning without a permit.
- Areas of stained pavement south of the galvanizing building were caused by spilled acid being placed in the 40,000-gallon waste acid storage tank.
- A hazardous waste storage area was located south of the galvanizing building. Hazardous wastes stored in this area included dried paint sludges, waste solvents, waste oils, super sacks filled with beta acid crystals, and open drums of acid sludge. This area was originally a large gravel area; however, a new concrete pad with curbing and an in-ground concrete sump for the collection of rainwater was constructed here in about 1994 (ENSR Consulting and Engineering [ENSR] 1994). This concrete pad is located just outside of the southeastern corner of the original gravel hazardous waste storage pad. Wastes were also stored in a staging area north of the hazardous waste storage area.
- A raw product storage area was located south of the northern manufacturing building. This area was used to store new drummed products, including paint and solvents. Waste paints, solvents, and waste oils frequently were observed mixed with the drummed products. Some photographs taken in this area show aboveground storage tanks (AST) that were used to store solvents, such as MEK, used in cleaning paint guns. Spills were observed in the soil around these ASTs (EPA 1988).

- A solvent recycling area was located on the southern side of the northern manufacturing warehouse, in a concrete block structure also known as Blockhouse 925. Waste paints and solvents generated during painting operations were recovered using a solvent recovery still. Open drums of paint waste and solvents frequently were noted in this area, which was used as a satellite accumulation area. Inspectors frequently noted an excessive number of drums and materials that had been stored for over 90 days in this area. The open paved area, south of the solvent recycling area, frequently was used for storage of drummed paint wastes and solvents, often in open drums.
- A satellite accumulation area for paint wastes was located adjacent to the paint line inside of the northern manufacturing warehouse. Inspectors frequently noted an excessive number of drums and materials that had been stored for over 90 days in this area.
- Two underground storage tanks (USTs) (a 1,000-gallon gasoline tank and a 6,000-gallon diesel tank) were located north of the guardhouse at the eastern entrance to the facility. These tanks were removed in 1991. They had passed a leak test the previous year and were in good condition when they were removed. There was some visual and olfactory evidence suggesting that the tanks may have leaked, which was noted by the removal contractor. A closure report was submitted in 1994. The closure report stated that soil samples collected in the vicinity of the tanks had total petroleum hydrocarbon concentrations of less than 10 mg/kg (Sorensen 1997a).

3.0 SOURCES

The following sections summarize source areas on site that were sampled during the RA and evaluated or used in the HRS scoring. The hazardous wastes stored or disposed of at these sources and the assigned waste quantity are discussed in the following sections. Analytical data from source sampling are summarized, as are the results of groundwater samples collected in and around these source areas. No background wells have been installed on site. To evaluate the results of groundwater samples collected from monitoring wells the results from the ESI were compared to the ESI results from three upgradient private wells, (OS-PW-05, 06, and 07). Groundwater samples from Geoprobe® temporary wells installed on site were compared to four upgradient temporary wells (OS-GGW-1, 2, 3, and 4) completed off site as background locations. A release to the groundwater pathway was considered to be a detection three times the highest concentration reported in the appropriate type of background well. If background results were all non-detects, a reported detection that was not coded and was above the detection limit reported for background samples, was considered to be a release to groundwater.

The results of the groundwater sampling were used to establish an observed release. The groundwater results were also used to establish the presence of hazardous substances at individual source, and

demonstrate that they were migrating from that source. Finally the presence of a hazardous substance in groundwater was used to assign the mobility in groundwater of that hazardous substance. Hazardous substances that were present in groundwater at concentrations meeting the observed release criteria were assigned a groundwater mobility value of 1 (per HRS Rule Section 3.1.2.2 [EPA 1990]).

Soil sampling data was evaluated in the following manner. During each sampling event (RFA, RFI, and RA) off-site soil samples were collected to establish background concentrations. The results of soil samples collected in suspected source areas during each specific sampling event was compared to the background sample concentrations for that sampling event. A reported concentration in a source which exceeded background concentrations was used to determine if a hazardous substance was present at a source. Areas of contamination which contained hazardous substances which exceeded three times the background concentration were evaluated as areas of contaminated soil where appropriate.

3.1 SURFACE IMPOUNDMENTS

LII constructed two surface impoundments in the southwestern corner of the site for neutralization of spent acid waste from galvanizing and chain manufacturing operations. These surface impoundments were used to neutralize 5 to 15 percent waste sulfuric acid piped from the galvanizing process. This acid was disposed of at a rate of 10,000 to 16,000 gallons per week, which was then neutralized by adding ammonium hydroxide (HWS 1989). The north and south impoundments were 100 by 100 feet and 100 by 90 feet, respectively, each with a depth of 4 feet. The southern impoundment was constructed in 1972 and was unlined. It was used until 1978, when it was replaced by the northern impoundment. The northern impoundment was constructed with a 0.25-foot bentonite liner and was used until 1984, when NDEC issued as Administrative Order, which required closure of the surface impoundments (HWS 1989). On March 3, 1984, during a CEI, inspectors observed a leak in a surface impoundment where the influent pipe had eroded the liner and waste acid had leaked into the surrounding soil (HWS 1989). Use of the surface impoundments was halted in June 1984. Closure of surface impoundments was conducted in November 1986 (HWS 1989). Closure activities involved pushing in the dike and covering each impoundment with a 6-inch layer of lime, a 1-foot layer of compacted soil, a 20-mil polyvinyl chloride liner, and another 1- to 2-foot layer of compacted soil (HWS 1989).

Waste sampling in surface impoundments indicated that the pH of the liquid waste was frequently below 2.0. Waste sulfuric acid generated at the galvanizing plant was sampled, and it contained cadmium

(20 mg/L), lead (28 mg/L), and zinc (67,500 mg/L) (HWS 1989; NDEC 1986a) (see Attachment 1). This waste sulfuric acid was a RCRA characteristic waste for corrosivity (D002), cadmium (D006), and lead (D008), based on these analytical results. NDEC collected sludge samples from the surface impoundment in 1984 and found high levels of lead (9,003 mg/kg) and zinc (34,088 mg/kg) (EPA 1988).

In August 1984, a preliminary hydrogeologic investigation was completed by HWS. Soil samples collected during this investigation were analyzed for metals using the Extraction Procedure Toxicity Test. Analytical results indicated that arsenic, cadmium, chromium, lead, mercury, and zinc were present in soil in surface impoundments, although the concentrations observed were below regulatory limits for regulated hazardous waste (HWS 1989). Total metals analysis of soil samples collected from surface impoundments showed the presence of cadmium, chromium, hexavalent chromium, lead, and mercury (HWS 1989).

In October 1985, 10 monitoring wells were installed in the vicinity of the closed surface impoundments (HWS 1989). These wells were named MW-1 through MW-10 and are located in the southwestern corner of the site. The locations of these wells are shown in Figure 3. Groundwater sampling from some of these wells was conducted quarterly from 1985 to the present. Groundwater results indicated the presence of elevated concentration of zinc (up to 1,400 microgram per liter [$\mu\text{g/L}$]), arsenic (up to 40 $\mu\text{g/L}$), cadmium (up to 12 $\mu\text{g/L}$), chromium (up to 30 $\mu\text{g/L}$), silver (up to 110 $\mu\text{g/L}$), and lead (up to 30 $\mu\text{g/L}$) (HWS 1989; Sorensen 1998). Also detected were high levels of sulfates (up to 3,600 $\mu\text{g/L}$) and nitrates (up to 19 mg/L). VOCs have been detected sporadically in samples collected from monitoring wells installed around closed surface impoundments. In 1993, a PCE concentration of 15 $\mu\text{g/L}$ was detected in MW-4 (ENSR 1993). In 1997, three samples were collected from Monitoring Well MW-4, which indicated that low concentrations of TCE (1.2, 1.1, and 1.6 $\mu\text{g/L}$) were present (Sorensen 1997b). In 1998, a low concentration of PCE (1.1 $\mu\text{g/L}$) was detected in Monitoring Well MW-6 (Sorenson 1998).

During the RA, the following hazardous substances were detected in soil at concentrations exceeding three times background. Shallow soil samples collected near the surface impoundments had concentrations of chromium, lead, and zinc that exceeded three times background.

During the RA, all 10 monitoring wells located around the surface impoundments were sampled. The following metals (total), were detected at concentrations three times greater than background: barium,

cadmium, chromium, lead, manganese, mercury, and zinc. The following dissolved metals were detected in concentrations that exceeded three times background: manganese, silver, selenium, and zinc. Benzene was detected in Monitoring Well MW-M-04 at concentrations of 1.2 µg/L, but not in any background samples.

3.1.1 Hazardous Substances

For scoring purposes, the following hazardous substances have been assigned to the surface impoundments: arsenic, barium, cadmium, chromium, lead, manganese, mercury, selenium, zinc, TCE, PCE, and benzene. All of these hazardous substances were detected in groundwater at concentrations which meet the observed release criteria.

3.1.2 Waste Quantity

For scoring purposes, the waste quantity associated with this source was calculated using Tier B, the hazardous wastestream quantity. Using Tier B requires that the total mass of the hazardous wastestream disposed of in the source can be estimated with a reasonable degree of confidence (EPA 1992). During compliance inspections, it was learned that between 10,000 and 16,000 gallons per week had been disposed of in the surface impoundments over a 12-year period (1972 to 1984) (HWS 1989).

The number of gallons disposed of in surface impoundments is calculated below:

$$10,000 \text{ gallons per week} \times 52 \text{ (weeks per year)} \times 12 \text{ (years of operation)} = 6,420,000 \text{ gallons}$$

$$16,000 \text{ gallons per week} \times 52 \text{ (weeks per year)} \times 12 \text{ (years of operation)} = 9,984,000 \text{ gallons}$$

Converting gallons to pounds was done by using the weight of water (8.8 pounds per gallon). This approach was conservative because sulfuric acid (87 percent solution) weighs almost twice as much per gallon as water (Glover 1998). The concentration of the sulfuric acid disposed of in surface impoundments was between 5 and 15 percent, making this waste denser than water.

$$6,420,000 \text{ gallons} \times 8.8 \text{ pounds/gallon} = 54,912,000 \text{ pounds}$$

$$9,984,000 \text{ gallons} \times 8.8 \text{ pounds/gallon} = 87,859,200 \text{ pounds}$$

The mass of the hazardous wastestream is divided by 5,000 when assigning a waste quantity using Tier B.

$$54,912,000 \div 5,000 = 10,982.4$$

$$87,859,000 \div 5,000 = 17,571.84$$

Assigning a value from HRS Table 2-6 gives a hazardous waste quantity factor value of 10,000 for both of the above-listed estimated quantities of waste disposed of in this source (EPA 1990, Section 2.4.2.2).

3.2 GALVANIZING BUILDING METAL TREATMENT SUMPS

The galvanizing building housed two sumps that housed tanks and vats that were used treat and galvanize metal parts. The eastern most sump housed a total of six tanks, which included a caustic wash tank, a two rinse water tanks, two sulfuric acid tanks, and a pre flux dip tank. The western sump contained a hot zinc plating bath.

Zinc and iron sulfate crystals from the beta acid reclamation system were stored in drums and placed in the pits located in the galvanizing building for storage prior to off-site transport and disposal (Sorensen 1997a). On November 11, 1995, and again on January 8, 1996, a pipe burst flooding the pits and the drummed acid crystals stored there with water (EPA 2000b). The clean-up report for this spill indicated that 55,000 gallons of water from the spill were treated and disposed of from tanks and pits located inside of the galvanizing building and from a pit located just south of the galvanizing building (CIS 1996). Two samples of the spill water were collected on November 9, 1995, by the Lockwood Corporation and by CIS on January 19, 1996, and both spill water samples were analyzed for pH and total metals. Both sets of results indicated that the spill water had pH values as low as 0.8, making it a RCRA characteristic hazardous waste for corrosivity (D002), and also contained total cadmium concentrations of 1.26 and 1.384 mg/L (CIS 1996). Chromium concentrations of 10.4 and 7.85 mg/L also were detected in the spill water. Also detected in the spill water was lead (3.23 and 3.097 mg/L) and zinc (7,106 and 3,563 mg/L). These spill waters were subsequently neutralized and disposed of off site as nonhazardous.

NDEQ issued a letter on September 3, 1996, indicating that a Closure Plan was required for the galvanizing pit area because hazardous wastes had been stored in this unit for over 90 days. On May 12, 1997, NDEQ followed this letter up with a Letter of Warning, indicating that Agromac had not filed a

Closure Plan (Sorensen 1997a). A Closure Plan for this area does not appear to have ever been filed by the facility.

In 1996, Powerhorse removed firebrick and leveling sand from the metal treatment and galvanizing pits, excavating them down to the original concrete floor. A new liner was placed on the concrete and another layer of concrete was placed over the liner. The excavated leveling sand and fire brick were deemed to be RCRA characteristic hazardous waste for lead (D008) and had a pH of 0.9 (EPA 2000a). These wastes were disposed of in an unspecified hazardous waste landfill on January 15, 1997.

Soil samples were collected from beneath the galvanizing pit by Powerhorse on August 30, 1996. These soil samples contained cadmium, chromium, copper, nickel, and zinc at concentrations characterized by EPA as exceeding background (EPA 2000a, 2000b). A single groundwater sample collected from a soil boring 6 feet beneath the galvanizing pit contained lead (0.64 mg/L), cadmium (0.103 mg/L), chromium (0.499 mg/L), nickel (0.622 mg/L), and zinc (126 mg/L) (EPA 2000b).

In March 1999, Powerhorse shut down the galvanizing operation and abandoned a number of process chemicals in the metal treatment and galvanizing pits. Seven large vats filled with various liquids, including two 5,000- to 6,000- gallon tanks filled with sulfuric acid, were abandoned. In addition, about 10,000 gallons of sulfuric acid were left in a tank on the southern side of the galvanizing building (EPA 2000a).

In February 2000, a water pipe burst in the galvanizing building, again flooding the vats and secondary containment areas (EPA 2000a). On December 11, 2000, the EPA OSC and the Emergency Response and Removal Services contractor began a Superfund TCRA. Five tanker loads of acid (17,000 gallons) and two tanker loads of caustic (8,000 gallons) liquids were removed from the site in December 2000. On June 4, 2001, liquids were pumped out of the spent acid pit south of the galvanizing building for off-site disposal. The empty treatment vats inside of the galvanizing building were then removed. The secondary containment around the treatment vats was used for neutralization of water from the rinse vats. Lime was added to the rinse water. About 30,000 gallons of treated rinse water was discharged to the Gering Public Treatment Works.

During a site reconnaissance conducted in November 2001, 11 drums, 13 bags, and 20 smaller containers of waste chemicals abandoned by Powerhorse were observed in a chemical storage area at the

northwestern corner of the galvanizing building (Tetra Tech 2001). The drums, primarily acids and caustics, were labeled and did not appear to be leaking. In addition, 32 Supersacks of beta acid crystals, weighing a total of 32 tons, were stored to the east of the metal treatment sump in the galvanizing building.

The beta acid crystals were sampled during the RA and contained high total concentrations of cadmium (49.3 mg/kg), chromium (650 mg/kg), manganese (2,210 mg/kg), and zinc (147,000 mg/kg). TCLP results indicated that the beta acid crystals exceeded the TCLP regulatory limits for characteristic hazardous waste for cadmium and chromium. Mercury concentrations were just below the regulatory threshold, and manganese (75.9 mg/L) and zinc (5,710 mg/L) concentrations were elevated. Beta acid crystals were frequently stored in the galvanizing building and other suspected source areas including the Hazardous Waste Storage Areas, and the Salvage Building. Analytical results from the beta acid crystals does provide attribution for these hazardous substances in the galvanizing building and in other source areas.

Shortly after the RA, the facility indicated that they had sold the beta acid crystals for use as a feed supplement and that all of the beta acid crystals had been shipped off site (Tetra Tech 2002). The facility also indicated that they were attempting to sell the remaining drummed chemicals. These quantities of chemicals and wastes were not evaluated in site scoring, because they either do not appear to be leaking or they have been removed from the site.

Sludges that were left in place after the removal action in the metal treatment sumps were sampled during the RA. The following hazardous substances were detected in the sludge: cadmium, chromium, lead, zinc, ethylbenzene, toluene, and xylene. TCLP analysis of the sludges showed high levels of zinc and manganese, that exceeded regulatory thresholds for RCRA characteristic hazardous waste for cadmium and lead. Elevated concentrations of zinc were detected in a soil sample collected from below the floor of the sump.

The sump that held the galvanizing tank had been backfilled with debris. During the RA, an excavator removed this debris, revealing that the bottom of the sump was constructed of a fire brick. The Geoprobe® encountered refusal on what appeared to be a large body of solidified zinc waste beneath the floor of the galvanizing sump. A piece of the zinc waste was submitted as a sample (GBS-Metallic), and this sample contained cadmium, mercury, and very high levels of lead (12,700 mg/kg) and zinc (743,000 mg/kg). Filtered groundwater samples collected from Geoprobe® temporary wells advanced

around the sumps in the galvanizing building contained concentrations of dissolved metals, including barium, lead, manganese, and zinc three times greater than background.

3.2.1 Hazardous Substances

Cadmium, chromium, lead, mercury, zinc, ethylbenzene, toluene, and xylene were detected in sludges and metallic wastes in or below the sumps in the galvanizing building. Groundwater samples collected below these sumps has contained barium, cadmium, chromium, lead, manganese, nickel, and zinc.

3.2.2 Waste Quantity

Sumps in the galvanizing building have held substantial quantities of hazardous waste. On two occasions, the sumps were filled with drummed wastes that were abandoned and then subsequently flooded. One cleanup resulted in treatment of 55,000 gallons of hazardous wastewater from these sumps. The second cleanup resulted in removal of 17,000 gallons of acid and 8,000 gallons of caustic and treatment of 30,000 gallons of wastewater. These wastes were removed and properly disposed of off site.

The dimensions of the sumps were used to make a conservative estimate of the waste quantity for these sources. The metal treatment sump is a roughly 50-square-foot (ft²) about 4 feet deep, or 10,000 cubic feet. The galvanizing sump is roughly 20 feet wide, 50 feet long, and 4 feet deep, or 4,000 ft³. Both sumps contained liquid wastes and therefore were evaluated as surface impoundments, with a combined volume of 14,000 ft³. These sumps were evaluated as a single source due to their close proximity, their use in the same production process (galvanizing), and the similar hazardous substances present in both sumps. Hazardous waste quantity for surface impoundments is calculated by dividing the volume of the surface impoundment in cubic yards by a factor of 2.5. The calculation of the waste quantity is shown below:

$$14,000 \text{ ft}^3 \div 27 \text{ (cubic feet per yd}^3\text{)} = 518.5 \text{ yd}^3$$

$$518.5 \text{ yd}^3 \div 2.5 = 207.4$$

3.3 SPENT ACID PIT

After the surface impoundments were removed from service in 1984, a 40,000-gallon pit was used to store spent sulfuric and hydrochloric acid generated at the site. Between 11,000 and 13,000 gallons per month of spent sulfuric acid and 1,600 gallons of spent hydrochloric acid per month were stored in this pit. The pit was brick, with an acid-resistant, rubberized liner. Waste acids were pumped out periodically and spent acids were regenerated off site. During the 2000 CERCLA removal action, this pit was half-filled with crystalized waste acid that was removed for off-site disposal. No analytical results of the wastestreams placed in this pit or of the crystalized acid that was removed were found in the files. Earlier sampling of spent sulfuric acid, the main wastestream managed in the spent acid pit contained cadmium, lead and zinc. There was evidence suggesting that the process which generated the spent sulfuric acid changed during operations at the site. It was therefore assumed that the same hazardous substances (cadmium, lead and zinc) were present in the pit that were present in an earlier sampling of the acid being sent to surface impoundments. Soil sampling was conducted for the first time at this source during the RA. Elevated levels of zinc were detected in soils collected adjacent to the spent acid pit.

3.3.1 Hazardous Substances

Cadmium, lead, and zinc were assumed to be present as liquids in this source, based on previous analytical results of spent sulfuric acid.

3.3.2 Hazardous Waste Quantity

This source was evaluated as a surface impoundment with a volume of 40,000 gallons. There are 201.974 gallons per cubic yard (yd³)(Glover 1998). The calculation of cubic yards and the waste quantity in the spent acid surface impoundment are shown below:

$$40,000 \text{ gallons} \div 201.974 \text{ (gallons per yd}^3\text{)} = 198.05 \text{ yd}^3$$

$$198.05 \text{ yd}^3 \div 2.5 \text{ (surface impoundment divisor from HRS Table 2-5)} = 79.2$$

3.4 HAZARDOUS WASTE STORAGE PADS A, B, C, AND D

According to the CEIs conducted at the facility between 1982 and 1999, the following wastestreams were handled in drum storage pads, with the following hazardous waste codes where applicable;

- Waste Acid Sludge (D002, Corrosive)
- Caustic Sludge (D002, Corrosive)
- Spent parts washing solvents, generally D001 (flammable), however some inspections noted that wastes from parts washers were handled as RCRA characteristic hazardous wastes D006 (cadmium), D008 (lead), D018 (benzene), D036 (nitrobenzene), D039 (PCE), and D040 (TCE) (EPA 1997).
- Waste MEK, xylene, acetone, isopropyl alcohol, and toluene, D001, F003, and F005
- Waste paint sludges, D001, F003, F005. Waste analyses of paint sludges conducted in 1984 by NDEC found high levels of lead (18,120 mg/kg), zinc (8,050 mg/kg), and chromium (3,810 mg/kg) (EPA 1988). In 1997, the EPA inspector determined that the paint sludges were characteristic hazardous wastes for chromium (D007), lead (D008), and MEK (D035), based on analyses performed by Safety-Kleen (EPA 1998).
- Waste paint and solvents, D001, F003, and F005
- Used oil and spent coolant, RCRA nonhazardous

The four hazardous waste storage pads were sampled during the RA. Soil samples collected from Hazardous Waste Storage Pad B contained concentrations of chromium, lead, and zinc that were three times greater than background. Hazardous Waste Storage Pad C had elevated concentrations of cadmium, lead, and zinc in soil that were three times greater than background. Lead and zinc also were previously detected in soils collected from this area at concentration greater than three times background during the RFA and RFI. No hazardous substances above background concentrations were detected in sampling conducted at Hazardous Waste Storage Pads A and D.

3.4.1 Hazardous Substances

Cadmium, chromium, lead, and zinc have been detected in soil samples at concentrations greater than background near Hazardous Waste Pads B and C.

3.4.2 Waste Quantity

The most applicable source type is contaminated soil. Soil sampling results indicated that four 50- by 50-foot grids in Hazardous Waste Storage Pad C and one 50- by 50-foot grid in Hazardous Waste Pad B contained hazardous substances at concentrations that significantly exceeded background. Each grid represents an area of 2,500 ft² of contaminated soil. The waste quantity assigned for Hazardous Waste Storage Pads B and C was calculated as follows:

$$12,500 \text{ ft}^2 \div 34,000 \text{ (contaminated soil divisor from HRS Table 2-5)} = 0.367$$

3.5 RAW PRODUCT STORAGE AREA

The Raw Product Storage Area was used to store new drummed products, including paint and solvents. Waste paints, solvents, and waste oils frequently were observed mixed, with drummed products. Some photographs taken in this area during CEIs show above ground storage tanks (ASTs) that were used to store solvents, such as MEK, that were used in cleaning paint guns. Spills were observed in the soil around these ASTs (EPA 1988). During the RFA, concentrations of chromium, lead, and zinc were detected in soils that were three times greater than background. During the RA, chromium, lead, and zinc also were detected at concentrations three times greater than background. Lead concentrations as high as 3,470 mg/kg were observed in one of the 50- by 50-foot grids. Two monitoring wells (RF-4 and LW-2) are installed in the eastern edge of the Raw Product Storage Area. During the RA, total lead and chromium concentrations exceeding three times background were detected in groundwater samples from both of these wells. Elevated concentrations of dissolved selenium were detected in one of the wells.

3.5.1 Hazardous Substances

Chromium, lead, and zinc were detected in soils collected at this source. Chromium, lead, and selenium were detected in groundwater at this source.

3.5.2 Waste Quantity

During the RFA, an area of contaminated soil measuring 20 by 110 feet was delineated, a total of 2,200 ft². During the RA, one 50- by 50-foot grid of additional contaminated soil was delineated. A total

area of 4,700 ft² of contaminated soil are present at this source. Using HRS Table 2-5, to assign a waste quantity value to an area, the area is divided by 34,000, as shown below:

$$4,700 \text{ ft}^2 \div 34,000 \text{ (contaminated soil divisor from HRS Table 2-5)} = 0.138$$

3.6 SOLVENT RECYCLING AREA

The solvent recycling area is located on the southern side of the north manufacturing warehouse, in a concrete block structure also known as Blockhouse 925. Waste paints and solvents generated during painting operations were recovered using a solvent recovery still. Open drums of paint waste and solvents were frequently noted in this area, which was used as a satellite accumulation area. Inspectors noted frequently excess numbers of drums of waste paints and solvents which had been stored for over 90 days in this area. The open, paved area south of the solvent recycling area was frequently used for storage of drummed paint wastes and solvents, often in open drums. During the RA, staining and evidence of paint spills were visible inside of the solvent recycling area and adjacent paved areas.

3.6.1 Hazardous Substances

No hazardous substances were detected above background concentrations.

3.6.2 Waste Quantities

No waste quantity was assigned for this source.

3.7 BORROW PIT

A borrow pit at the southern side of the eastern entrance of the facility was used for disposal of spent coolant from the machine shop. This area was not sampled during the RFA, because there was no visual evidence of a release and the waste coolant was deemed to be nonhazardous. During the RA, concentrations of chromium, mercury, and zinc were detected in soil samples collected at this source which were three times greater than background.

3.7.1 Hazardous Substances

Chromium, mercury, and zinc were detected in soil samples at concentrations three times greater than background.

3.7.2 Waste Quantity

The most applicable source type is contaminated soil. Soil sampling does not clearly delineate an area of observed contamination in soil. Therefore, no waste quantity was assigned for the borrow pit.

3.8 USED OIL AND EMPTY BARREL STORAGE AREA

An area in the southeastern corner of the site was used for storage of waste oils and empty drums. An aerial photograph taken in 1992 shows this area largely covered with stored materials, including large areas that appear to be covered with drums (Attachment 2). During the RFA, four areas of stained soil were sampled. No significantly elevated concentrations of hazardous substances were noted during the RFA. During the RFI, 12 soil samples were collected from this area. Levels of lead and zinc three times greater than background were reported. One soil sample contained 1,1,1-trichloroethane (TCA) at concentrations of 56 micrograms per kilogram ($\mu\text{g/kg}$), and oil and grease (O&G) concentrations of up to 5,900 mg/kg were reported in the storage area itself. A drainage swale leading away from this area also was sampled and contained O&G concentrations of up to 2,300 mg/kg.

During the RA, elevated concentrations of lead (1,260 mg/kg), mercury (0.19 mg/kg), and zinc (6,040 mg/kg) were detected in soils. A total of six of the 50-foot grid sections contained concentrations of hazardous substances that exceeded three times the background concentrations.

Two monitoring wells located on this source contained concentrations of total barium, cadmium, chromium, lead, and manganese three times greater than background. Dissolved selenium also was detected in concentrations that were three times greater than background during the RA.

3.8.1 Hazardous Substances

Lead, mercury, zinc, and 1,1,1-TCA have been detected in soil samples at this source at concentrations three times greater than background. Barium, cadmium, chromium, lead, manganese, and selenium have been detected in groundwater at concentrations three times greater than background.

3.8.2 Waste Quantity

This source is evaluated as contaminated soil. The total area of contaminated soil is 6,000 ft². To calculate the waste quantity assigned, the area of contaminated soil in square feet is divided by 34,000 as specified in HRS Table 2-5.

$$6,000 \text{ ft}^2 \div 34,000 = 0.176$$

3.9 BURN PIT

The Burn Pit, located northeast of the galvanizing building in the Used Oil and Empty Drum Storage Area, was being used for disposal of solid waste, including wood, paper, plastic, and food scraps, by open burning without a permit during a CEI conducted in 1997 (EPA 1998). Thirty cubic yards of ash were removed from this pit and sent to the Gering Municipal Landfill as nonhazardous waste. Analytical results for this waste confirmed that it was nonhazardous.

During the RA, four soil boring were advanced in this area. No elevated concentrations of hazardous substances were detected.

3.9.1 Hazardous Substances

No hazardous substances were detected in significantly elevated concentrations at this source.

3.9.2 Waste Quantity

No waste quantity was assigned to this source.

3.10 SALVAGE BUILDING SEPTIC TANK

A septic tank that drained the salvage building was sampled during the RA. Hazardous wastes, including beta acid crystals and various zinc wastes, were stored in this building. The following hazardous substances were detected in sludge samples collected from the septic tank: arsenic, cadmium, lead, mercury, zinc, ethylbenzene, and xylene. Monitoring Well LW-4, located near the septic tank, had concentrations of total chromium, lead, manganese, and dissolved manganese three times greater than those reported in background groundwater samples collected during the RA.

3.10.1 Hazardous Substances

Arsenic, cadmium, lead, mercury, zinc, ethylbenzene, and xylene were reported in sludge samples. Groundwater samples in a nearby monitoring well contained concentrations of chromium, lead and manganese which exceeded three times the background concentrations.

3.10.2 Waste Quantity

The dimensions and volume of the septic tank are unknown. No waste quantity was assigned to this source.

3.11 SCRAP METAL WASTE BIN

Metal shavings from the manufacturing building were stored at this source. These were placed in roll-off bins east of the manufacturing building. Staining from oils on the shavings were observed on the ground around the roll-off bins. During the RFA, soil samples collected from the Scrap Metal Waste Bins Area contained elevated levels of cadmium, chromium, copper, iron, nickel, lead, and zinc compared to background concentrations. During the RFI, eight soil samples and one field duplicate were collected from the Scrap Metal Waste Bin Area from depths of 0 to 5 feet. Several soil samples had lead at concentrations three times greater than background. Soil samples collected during the RA contained chromium, lead, and zinc at concentrations three times greater than background. Chromium and lead were detected in a nearby monitoring well (RF-5) at concentrations three times greater than background. PCE also has been detected in this monitoring well during multiple sampling events including the RA. A sludge sample collected from a storm water sump at this source contained 2-hexanone (also known as

methyl butyl ketone), 4-methyl-2-pentanone (also known as methyl isobutyl ketone or MIBK), chlorobenzene, chloromethane, ethylbenzene, toluene, and xylene.

3.11.1 Hazardous Substances

Cadmium, chromium, copper, iron, nickel, lead, and zinc have been detected in soils at this source at concentrations three times greater than background. Chromium, lead, and PCE have been detected in groundwater samples from a nearby monitoring well at concentrations three times greater than background. Methyl butyl ketone, MIBK, chlorobenzene, chloromethane, ethylbenzene, toluene, and xylene have been detected in sludges.

3.11.2 Waste Quantity

Two source types are located within this area, contaminated soil and the storm water sump that was evaluated as a surface impoundment. No areas of contaminated soil could be delineated using analytical results. The storm water sump is roughly 10 by 10 feet and 8 feet deep, or 800 ft³ or 29.6 yd³. Using HRS Table 2-5, a hazardous waste quantity is assigned by dividing the volume of the surface impoundment in cubic yards by 2.5. The resulting waste quantity is 11.85.

$$29.6 \text{ yd}^3 \div 2.5 = 11.85$$

3.12 VOLATILE ORGANIC COMPOUND PLUME

Two rounds of groundwater sampling were conducted as part of the RFI in 1992 and 1993. Four of the 13 on-site monitoring wells were sampled for volatile organic compounds (VOCs). Significant concentrations of VOCs were detected in all four wells. A groundwater contour map and isoconcentration map showing the locations of these VOC detections is provided as Attachment 3. TCE was detected in Monitoring Well LW-3 (16 µg/L) and LW-7 (2 J µg/L). PCE was detected in Monitoring Wells LW-3 (15 µg/L), LW-7 (29 µg/L), LW-8 (2 J µg/L), and RF-5 (36 µg/L).

In September 1999, USGS performed additional groundwater sampling at the Agromac Site (USGS 2000). Three on-site monitoring wells were sampled. The three monitoring wells selected for sampling were those wells that had VOCs detected in them during the RFI. VOC concentrations dropped

significantly in these wells during the USGS sampling: PCE was detected in all three monitoring wells sampled; LW-3 (2.1 µg/L), LW-7 (0.98 µg/L), and RF-5 (1.3 µg/L). TCE was detected in two of the monitoring wells, LW-3 (3.8 µg/L) and LW-7 (0.95 J µg/L).

During the RA, all on-site monitoring wells were sampled for VOCs. PCE was detected in Monitoring Wells LW-03 (0.99 J µg/L), LW-07 (0.96 J µg/L), and RF-5 (1.40 µg/L). PCE also was detected in a groundwater sample (2.30 µg/L) collected from Geoprobe® Temporary Well SA-GGW-1, located in the northeastern corner of the property. No VOCs were detected in off-site wells by the confirmation laboratory. TCE was not detected in groundwater samples collected during the RA.

During the RA, soil gas samples were collected at potential sources of VOCs to determine the source of VOCs detected in groundwater. The results of this soil gas sampling indicated that low levels of VOCs, including TCE, PCE, and 1,1,1-TCA, were present in the part-per-billion range, with a maximum concentration of 5 µg/L. Low levels of VOCs were detected in soil gas over most of the site. Confirmation soil samples for off-site analysis were collected in areas with the highest soil gas concentrations. Only one soil sample contained PCE (2.5 µg/kg). No well defined source of VOCs could be found.

3.12.1 Hazardous Substances

TCE and PCE have been detected in groundwater, but no source area has been found.

3.12.2 Waste Quantity

This source is considered to be a groundwater plume with no known source. No waste quantity could be assigned for this source.

4.0 SITE GEOLOGY

The site lies within the North Platte Valley in Scottsbluff County, Nebraska. This area is within the High Plains division of the Great Plains physiographic province.

The North Platte Valley was formed by dissection of the High Plains the North Platte river, which has eroded more than 1,000 feet of tertiary-age sediments. The site is located about 2 miles south of the North Platte River in the Quaternary alluvium of the flood plain.

The Cretaceous and Tertiary-age material underlying the Quaternary consists of semiconsolidated to consolidated gravel, sand, silt, and clay, which were deposited as alluvial outwash from the Rocky Mountains. The formations in the High Plains in Scottsbluff consist of, in descending order, the Arikaree, Gering, Brule, Chadron, and Lance (USGS 1995).

The Brule underlies the site and in the North Platte Valley, is covered with a mantel of unconsolidated terrace fill and recent alluvium that reaches thicknesses of 200 feet in places (Hoskins-Western-Sondregger, Inc. 1984). The Brule Formation is a light-colored silt or sandstone, frequently massive in character, without bedding or layering. Much of this formation was deposited by ancient streams. Some channel sands and volcanic ash accumulated locally within the Brule. These stream channel deposits within the Brule generally form unconfined water-bearing units that can yield water over small areas (USGS 1995). Part of the Brule consists of eolian (windblown) sediments similar to loess, that is, fairly uniform, silt-sized deposits. The Brule is calcareous and has zones of lime-cemented materials that are less permeable. These less-permeable zones form a confining unit that separates the unconfined water bearing units of the Brule from the lower Chadron Formation (USGS 1995). The Chadron rarely is used for water supply because of its great depth, and water quality that makes it unsuitable for most uses (USGS 1995). The Brule may weather into a blocky or slabby structure that may create secondary porosity in the formation (USGS 1995). Secondary porosity in the Brule also is caused by piping, a process where the action of moving water opens channels and conduits in rocks, with limited cohesion (Hoskins-Western-Sondregger, Inc. 1984). Areas of the Brule Formation where these secondary porosity features are found typically yield high quantities of water (USGS 1995). Such areas are found locally along the North Platte Valley (USGS 1995). As shown in Appendix A, Figure 5, most the municipal wells within the target distance limit are located in the North Platte Valley.

The alluvium overlying the Brule is a complex mixture of sand and gravel and silts and clays. The depth to the Brule Formation on site varies from 21 to 35 feet below ground surface (bgs). The lithology of the alluvium overlying the Brule is shown on cross sections, provided as Attachment 3. A silt loam material is found from the surface to depths of between 5 to 12 feet bgs (ENSR 1994). Some of this silt loam may be fill material. File information suggested that the site may have been raised by the addition of 2 to

4 feet of fill prior to construction of the buildings on site (Hoskins-Western-Sondregger, Inc. 1984). The material underlying the silt loam is predominately a gravelly sand, with varying amounts of silt and clay. The surface of the Brule dips gently to the northeast. Groundwater is encountered at depths of between 8.35 and 19.71 feet bgs (ENSR 1993). Groundwater flow is to the northeast (Hoskins-Western-Sondregger, Inc. 1984; ENSR 1994). All monitoring wells installed on site are screened in the alluvium, or in the Brule Formation.

During the RFI, a pilot boring for geotechnical analysis was drilled on site. Particle size distribution analyses were performed on soil samples collected from depths of 16 to 18, 36 to 37, and 40 to 42 feet bgs. The percentages of fine materials increased with depth, with upper samples consisting of mostly fine to medium sand and deeper samples consisting of silty sands. Slug tests were conducted on four wells, and estimated hydraulic conductivities ranged from 8 to 42 feet per day. The average hydraulic conductivity was 3×10^{-3} , which is consistent with a sandy aquifer (ENSR 1994).

During the RA, water level measurements were taken from all on-site monitoring wells. These water levels were used to generate the groundwater contours shown in Figure 3 (see Appendix A, Figure 3). Groundwater flow appears to be to the northeast towards the Platte River. Groundwater was encountered at depths ranging from 6 to 9 feet bgs. All Geoprobe temporary wells were installed in the alluvium.

A printout from a Nebraska State database of public supply wells located in the Scottsbluff area shows the depths of municipal wells in the area (see Attachment 4). The total depths for all but one of the municipal wells are between 57 and 158 feet bgs. This would suggest that these wells are screened in either the alluvium or the Brule Formation. Large quantities of water in the Brule Formation are typically produced in areas of secondary porosity such as those found along the North Platte River Valley (USGS 1995).

The depth of most of the private wells sampled is unknown. Several well owners that did know the depth of their wells stated total well depths between 50 and 80 feet. This range of depths would indicate that the private wells were screened in the alluvium or the Brule Formation. For scoring purposes it was assumed that all private wells were screened in the alluvium or the Brule Formation. The next deepest water bearing unit is the Chadron Formation which is rarely used due to depth and poor water quality (USGS 1995).

For the purpose of scoring, the alluvial aquifer and the Brule Formation are considered to be one aquifer system. No evidence of confining layers between these two aquifers were reported in available geologic reports or the well logs from site investigations conducted at the facility. Secondary porosity occurs in the Brule Formation along the North Platte River Valley and vertical recharge from the overlying alluvium recharges these areas of secondary porosity (USGS 1995).

5.0 SITE SCORING

Tetra Tech START scored only the groundwater water migration pathway. The soil exposure, surface water, and air migration pathways were not scored. Available data indicate that the potential for soil exposure and air and surface water migration are low and that the target population that would be impacted by such a release would be minimal.

A groundwater migration pathway score of 100 was calculated based on the following factors. A likelihood of release value of 550 was assigned, established by observed releases to on-site monitoring wells screened in the alluvial aquifer. A waste characteristics value of 100, and a target factor value of 237.9 as described below.

5.1 GROUNDWATER PATHWAY SCORING

The groundwater migration pathway scoring approach is shown below. The three major components of the groundwater score are likelihood of release, waste characteristics, and target population.

5.1.1 Likelihood of Release

An observed release to the groundwater migration pathway has been established in the principal aquifer beneath the Agromac Site, based on analysis of monitoring well samples collected from the alluvial aquifer. Contaminants identified in monitoring wells on site include PCE, TCE, benzene, arsenic, barium, cadmium, chromium, lead, manganese, mercury, nickel, selenium, and zinc. These contaminants were detected in groundwater at concentrations significantly above background (that is, at a concentration three times above a detected background concentration or equal to or above the sample quantitation limit of a nondetect background result).

The 23 existing monitoring wells had been installed during previous investigations of the site; 10 of these are clustered around surface impoundments. The nature of the site makes installation of a background well problematic. Surface impoundments are located in the extreme southeastern corner of the site. Previous groundwater contouring and water levels recorded during the RA show that the predominant direction of groundwater flow is to the northeast, making the surface impoundment upgradient from the rest of the site. Two monitoring wells, M-3 and M-8, appear to be in locations that might be appropriate for collection of an upgradient background sample. However, groundwater sampling performed as part of the hydrogeologic investigation of surface impoundments suggested that there was radial flow away from the surface impoundments (HWS 1984; EPA 1988). Contouring of the specific conductivity showed that monitoring wells M-8 and M-3 were within an area of elevated specific conductivity centered around the surface impoundment (see Attachment 5). This suggests that these wells may be impacted by releases from surface impoundments and may not be suitable background wells. Therefore, results of groundwater samples collected during the RA were compared to results of three upgradient domestic wells screened in the alluvial aquifer. The highest concentration for each individual contaminant of concern from these three background wells was selected as the background concentration for that contaminant for comparison purposes.

5.1.2 Waste Characteristics

Waste characteristics values were assigned using the toxicity and mobility of hazardous substances associated with the sources at the site, the waste quantity associated with the sources, and the degree of containment associated with the sources.

5.1.2.1 Waste Quantity

A waste quantity for the site was calculated using all the sources that have a containment value of greater than zero. All sources previously described in Section 3.0 have non-zero containment values. The waste quantity for each source was calculated previously for each individual source. Table 1 presents a summary of the assigned waste quantity associated with each source. The total of all of the calculated waste quantities for all sources evaluated is 11,281.531. The assigned hazardous waste quantity factor value from HRS Table 2-6 is 10,000.

5.1.2.2 Toxicity/Mobility

All hazardous substances detected in source samples were used to calculate a toxicity/mobility factor value for the site. Those substances detected in groundwater were assigned a mobility of 1. These hazardous substances and their associated toxicity/mobility are shown in Table 2. The toxicity/mobility factor value assigned to the Agromac Site is 10,000, based on detection of arsenic, barium, cadmium, chromium, lead, manganese, mercury, and nickel in concentrations meeting the observed release criteria in groundwater samples. All of these substances are assigned the maximum toxicity mobility factor value, which is 10,000 in the Superfund Chemical Data Matrix (EPA 1996).

5.1.2.3 Waste Characteristics Factor Value

The waste quantity factor assigned to the site is 10,000, which is based on the sum of all sources used in scoring. The waste quantity factor (10,000) is multiplied by the toxicity/mobility factor (10,000) and the resulting product (10^8) is used to assign the waste characteristic factor value for the site, assigned from HRS Table 2-7. The waste characteristic factor value for the site is 100.

5.1.3 Groundwater Targets

This section discusses target factor values for the groundwater pathway, including the nearest individual, population targets for actual and potential contamination, wellhead protection areas, and resources. The sum of each of these factors produced a final targets factor category score of 237.9.

5.1.3.1 Nearest Individual

For the groundwater migration pathway, the nearest individual is considered to be the nearest well or the well with the highest level of contamination (that is, Level I or Level II).

Three private wells near the southeastern corner of the site, across the street from the eastern edge of the Agromac property, were sampled during the RA, as shown in Figure 4. Samples from two of these wells, OS-PW-11 and OS-PW-12, had low concentrations, 0.179 and 0.106 $\mu\text{g/L}$ of PCE, respectively, reported by the on-site laboratory. Split samples from these wells were reported as nondetects by the off-site laboratory, at sample quantitation limits of 0.5 $\mu\text{g/L}$. During a groundwater sampling event conducted by

USGS in September 1999, one off-site well, PW-3, also located near the southeastern corner of the site, contained PCE at concentrations of 0.27 J µg/L (USGS 2000). No health based benchmarks were exceeded in any drinking water wells. These detections of PCE in off-site private wells near the southeastern corner of the site were not evaluated as Level II contamination, because the USGS results were qualified. The RA detections of PCE in a drinking water well could not be confirmed by the off-site laboratory.

The nearest private well is located less than 200 feet to the northeast of the site. Access to sample this well during the RA was denied. A nearest individual factor value of 20 was assigned, because this drinking water well is located within 0.25 mile of the site. A total of 12 drinking water wells have been identified within the 0.25-mile distance ring, as shown in Figure 5.

5.1.3.2 Population

The total population factor value is the sum of the potential contamination, the Level I actual contamination, and the Level II actual contamination factors. No actual contamination in a drinking water supply has been documented, nor have any Level I or II target populations have been identified. Table 5 summarizes the population scoring for the groundwater migration pathway. This table shows the only target population identified that is subject to potential contamination.

During a site reconnaissance conducted in November 2001, Tetra Tech visited the offices of several water departments in the area to document the location of groundwater wells that supply the municipal drinking water in the vicinity of the site. Each municipality contacted provided the location of the municipal wells on a city map. The locations of these wells is shown in Figure 5.

At the City of Gering, Tetra Tech met with Tim O'Neal, an operator with the City Water Department. Mr. O'Neal indicated that the City of Gering supplied water to 7,800 individuals, all located within the City of Gering. No outside utility companies or rural water districts purchased water from the City of Gering, although an emergency connection was being installed with the City of Scottsbluff. Water was supplied by 14 active municipal wells. The city had no surface water intakes, and none of the wells supplied more than 40 percent of the entire water supply. All active wells were screened in the alluvium or the Brule Formation. Based on population of 7,800 persons supplied by 14 wells, the population served by each Gering municipal well is 557 persons per well.

Well Number 6, located immediately to the west of the Agromac Site, was on emergency stand-by status. It was scheduled to be shut down next year. The city was no longer using Well No. 6, because the water from the well was too high in total dissolved solids. The city attributed these high levels of dissolved solids to the nature of the Brule Formation, in which the well was screened. Well No. 6 is located 140 feet west of the western boundary of the Agromac Site. Sampling results from the RA showed the following total metals concentrations, which meet the observed release criteria: barium (243 µg/L), lead (9.4 µg/L), manganese (509 µg/L), and zinc (142 µg/L). Because this well is no longer in active use, this well was not considered to be subject to Level II concentrations, nor was it evaluated as target for calculating populations subject to potential contamination.

At the City of Scottsbluff, Tetra Tech interviewed Vicky Thomason, Administrative Assistant with Earth Tech, an outside contractor that runs the municipal water system under contract to the city.

Ms. Thomason indicated that the municipal water system supplied 14,800 people. The city uses 12 active wells and has two additional wells (No. 4 and 6) that are on stand-by status. Jack Satur, the city water superintendent, indicated the wells No. 4 and 6 had not been used for several years and were being taken out of service. These standby wells were not evaluated for scoring purposes as they are no longer in use. There are no surface water intakes, and no well supplies more than 40 percent of the city's total water supply. Scottsbluff municipal wells are screened in the Brule Formation or in alluvium.

Scottsbluff does not supply water to another water district. Based on population of 14,800 persons supplied by 12 active wells, the population served by each Scottsbluff municipal well is 1,233.3 persons per well.

Tetra Tech contacted the City of Tarrytown by telephone following the site reconnaissance. Ken Furrey, a technician with the City Utilities Department, provided information about the municipal water supply. Tarrytown provides municipal water to 2,300 individuals. The city uses three wells, all of which are used about equally in rotation. Tarrytown wells are screened in the Brule Formation or in alluvium. Tarrytown has no surface water intakes and relies solely on well water. Based on a population of 2,300 persons supplied by three wells, the population served by each Tarrytown municipal well is 767 persons per well.

Additional target populations were calculated by performing house counts in rural areas outside of city limits, as shown on Figure 5. Population was assigned by using the average population per household in Scottsbluff County (2.44) by the number of houses counted in each distance ring (U.S. Census Bureau

2002). The population calculated in this manner is shown in Table 4. It was assumed all private wells are screened in the Brule Formation, or in alluvium.

The total potential target population is calculated by summing the municipal well target population by distance ring, as shown in Table 3, with the population assumed to be using private wells, as shown in Table 4. These summed populations are then assigned a distance-weighted population value from HRS Table 3-12. The nonkarst portion of this table was used to assign the distance-weighted population values. This calculation is shown in Table 5.

Using Table 3-12, the assigned distance-weighted population value was 2,079, based on the assumptions shown in Table 5. This distance-weighted population must be further divided by 10, as specified by the HRS Rule (Section 3.3.2.4), because this population is subject to potential contamination. After dividing by 10, as specified for evaluating targets subject to potential contamination, the assigned population is 207.9 persons. A value of 20 was assigned for nearest individual. A value of 5 was assigned for resources, based on the presence of irrigation wells within the target distance limit (TDL). An additional value of 5 was assigned because of the presence of wellhead protection areas within the TDL.

6.0 OVERALL SITE SCORE

The overall site score is 50, based on the score generated by the groundwater pathway. This is well above the required 28.5 needed for inclusion on the NPL. This score reflects the current conditions at the site based on available analytical data. The surface water and air migration pathways, and the soil exposure threat were not scored because their contribution to the site score would be minimal.

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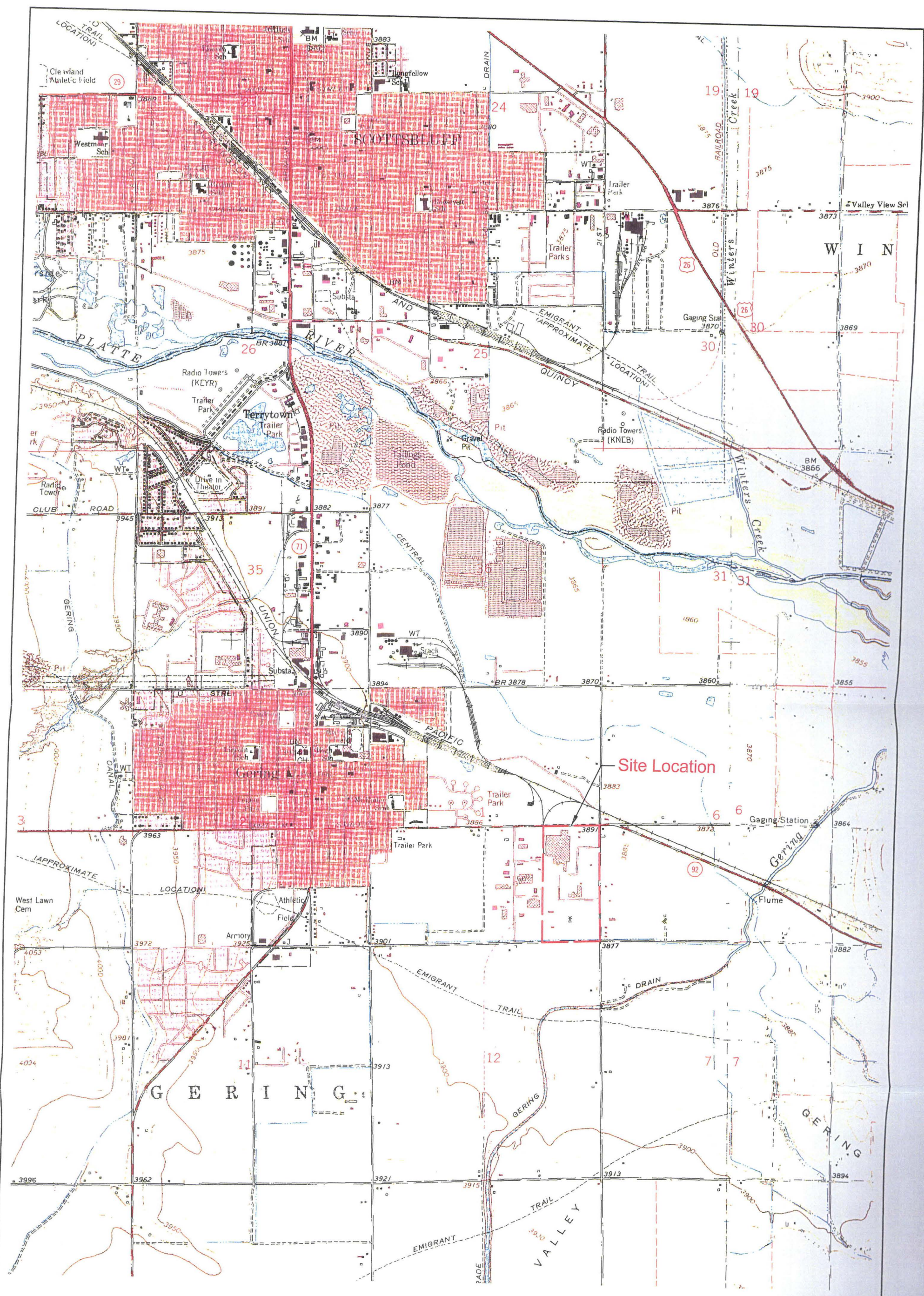
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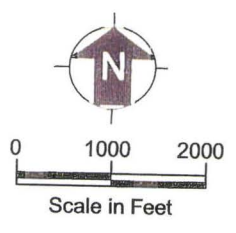
APPENDIX A


FIGURES

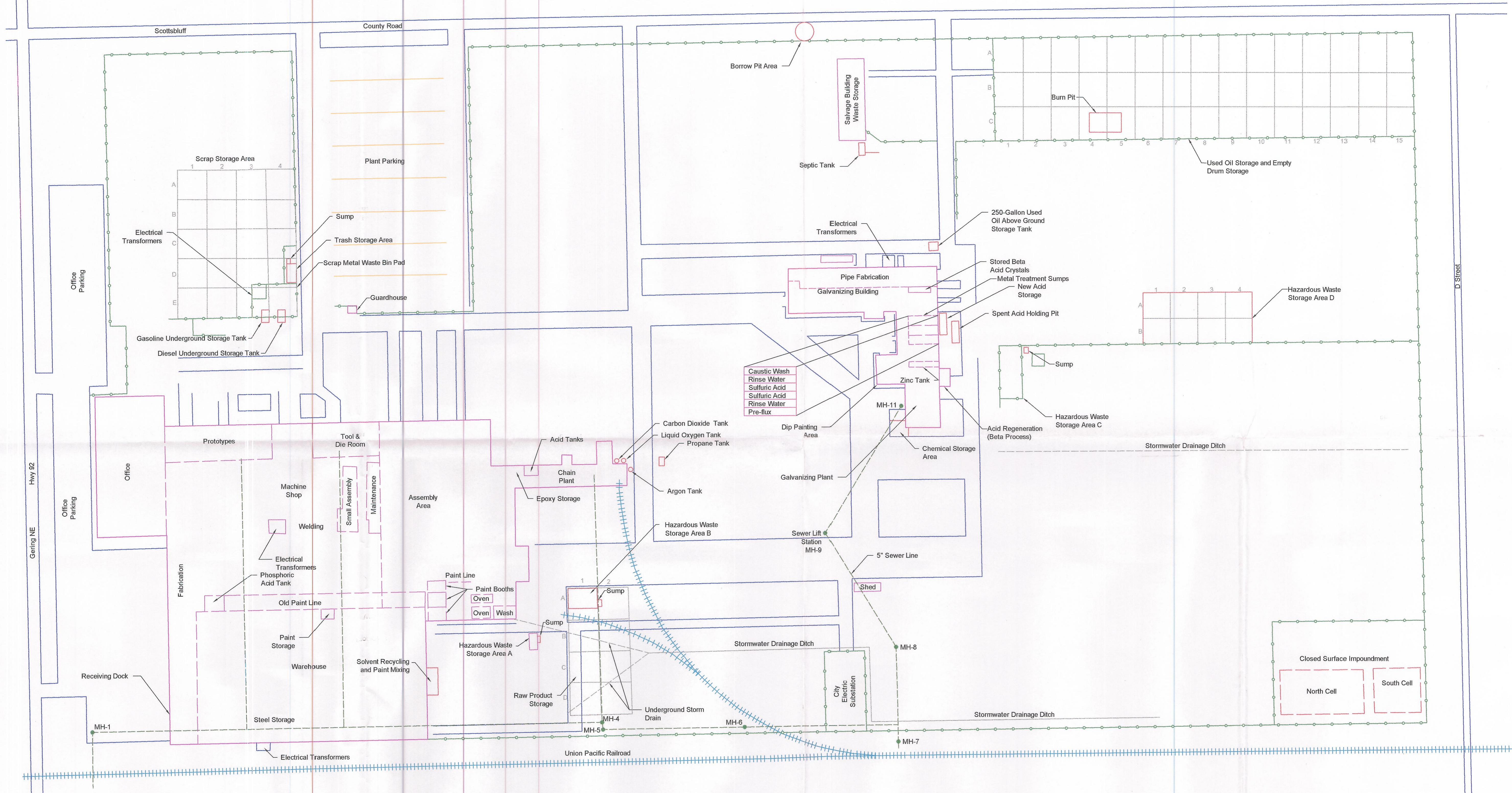
(Five Pages)



SOURCE: USGS Scottsbluff South, NE 7.5 Minute Topo Quad 1963 PR 376
 USGS Minatare, NE 7.5 Minute Topo Quad 1965



Agromac-Lockwood Facility Gering, Nebraska	
FIGURE 1 Site Location Map	
	Tetra Tech EM Inc.
Date: 12/10/01	Drawn By: Colin Wille Project No: G0011.L01.0008.10



Legend

- Edge of pavement
- Sewer line
- Railroad tracks
- Building
- Fence
- Manhole

North Arrow

0 88 176

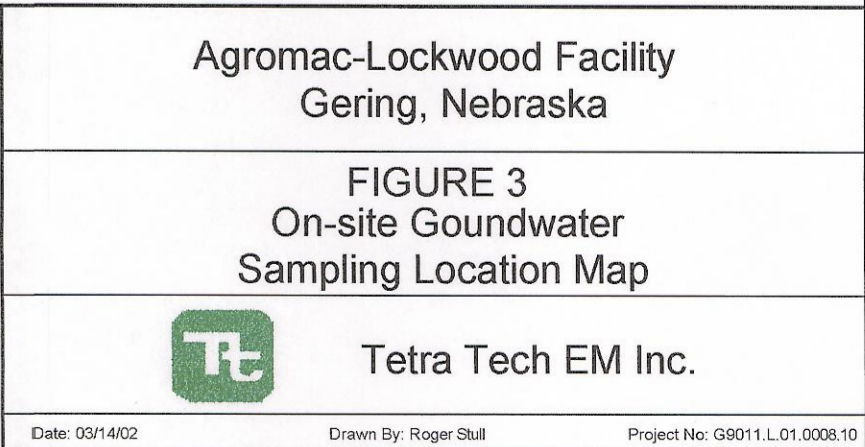
Approximate Scale in Feet

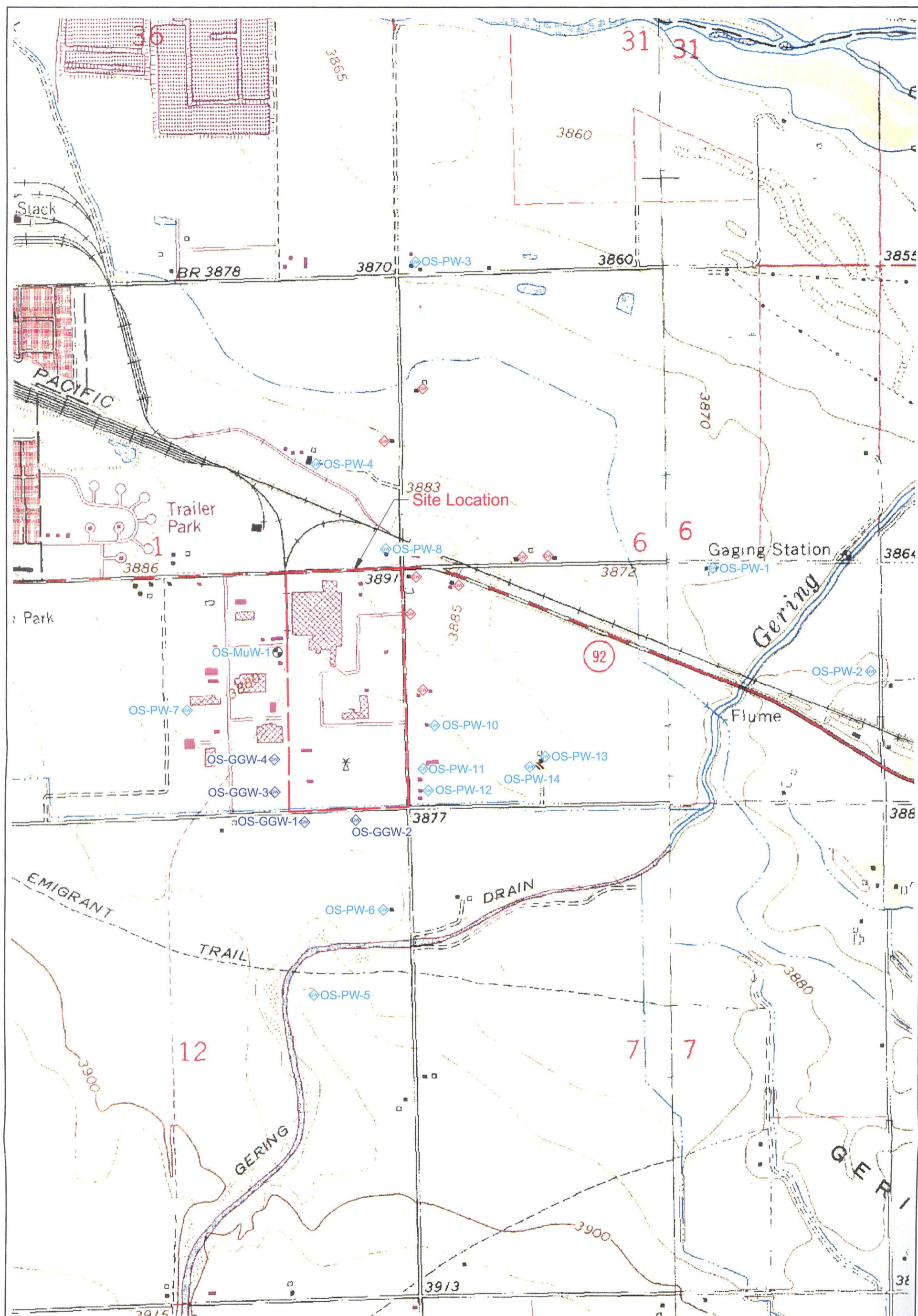
Agromac-Lockwood Facility
Gering, Nebraska

FIGURE 2
Site Layout Map

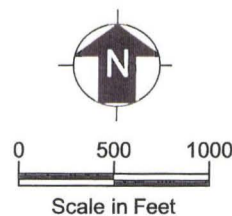
Tt Tetra Tech EM Inc.

Date: 03/14/02 Drawn By: Roger Stull Project No: G9011.L01.0003.10





- Legend**
- ◆ Geoprobe groundwater sample
 - ◆ Private well sample location
 - ◆ Private well sample refusal
 - Gering municipal well



Agromac-Lockwood Facility
Gering, Nebraska

FIGURE 4
Off-site Groundwater
Sampling Location Map



Tetra Tech EM Inc.

SOURCE: U.S. Geological Survey Scottsbluff South, NE 7.5 Minute Topologic Quadrangle, 1963, Photo Revised 1976
U.S. Geological Survey Minatare, NE 7.5 Minute Topologic Quadrangle, 1965

Date: 03/18/02

Drawn By: Roger Stull

Project No: G9011.L01.0008.10

APPENDIX B

TABLES

(Five Pages)

TABLE 1

**HAZARDOUS WASTE QUANTITY BY SOURCE
AGROMAC-LOCKWOOD OPERATING UNIT NUMBER 2, GERING, NEBRASKA**

Source	Hazardous Waste Quantity
Surface Impoundments	10,982.4
Galvanizing Building Sumps	207.4
Spent Acid Pit	79.2
Hazardous Waste Pads	0.367
Raw Product Storage Area	0.138
Solvent Recycling Area	0
Barrow Pit	0
Used Oil and Empty Drum Storage Area	0.176
Burn Pit	0
Salvage Building Septic Tank	0
Scrap Metal Waste Bin	11.85
VOC Plume	0
Total	11,281.531

Source: 40 CFR 300 Appendix A, Table 2-5

TABLE 2**HAZARDOUS CONSTITUENTS FOR THE GROUNDWATER PATHWAY
AGROMAC-LOCKWOOD OPERATING UNIT NO. 2**

Hazardous Substance	Hazardous Constituent Factors		
	Toxicity	Mobility	Toxicity/Mobility
Arsenic*	10,000	1	10,000
Barium*	10,000	1	10,000
Cadmium*	10,000	1	10,000
Chromium*	10,000	1	10,000
Lead*	10,000	1	10,000
Manganese*	10,000	1	10,000
Mercury*	10,000	1	10,000
Nickel*	10,000	1	10,000
Selenium*	100	1	100
Zinc*	10	1	10
Trichloroethene*	10	1	10
Tetrachloethane*	100	1	100
Benzene*	100	1	100

* A mobility factor value of 1 is assigned based on an observed release to groundwater for this compound.

TABLE 3**MUNICIPAL WELL POPULATION BY DISTANCE RING
AGROMAC-LOCKWOOD OPERATING UNIT NUMBER 2, GERING, NEBRASKA**

Distance Ring (In Miles)	Municipality	Number of Wells Per Distance Ring	Population Per Well	Total Population Per Distance Ring
0 to ¼	NA	NA	NA	0
¼ to ½	NA	NA	NA	0
½ to 1	NA	NA	NA	0
1 to 2	Gering	9	557	5,013
2 to 3	Gering	5	557	2,785
	Terrytown	3	766.7	2,100
	Scottsbluff	1	1233.3	1233.3
Total (2-3)				6,118.3
3 to 4	Scottsbluff	7	1233.3	8,633

TABLE 4

**POPULATION PER DISTANCE RING AS ESTIMATED BY HOUSE COUNT
AGROMAC-LOCKWOOD OPERATING UNIT NUMBER 2, GERING, NEBRASKA**

Distance Ring (In Miles)	House Count	Population Per Household	Population Per Distance Ring
0 to ¼	12	2.44	29.28
¼ to ½	10	2.44	24.44
½ to 1	13	2.44	31.72
1 to 2	66	2.44	161.04
2 to 3	113	2.44	275.72
3 to 4	181	2.44	441.64

TABLE 5

GROUNDWATER TARGET POPULATION BY DISTANCE RING

Agromac-Lockwood Operating Unit 2

Gering, Nebraska

Distance Ring (in miles)	Private Well Population per Ring ^a	Municipal Well Population per Ring ^b	Total Population per Ring	Distance-weighted Population Values (From HRS Table 3-12)
0-¼	29.28	0	29.98	17
¼ to ½	24.44	0	24.44	11
½ to 1	31.72	0	31.72	17
1 to 2	161.04	5,013	5,174.04	939
2 to 3	275.72	6,118.3	6,394.02	678
3 to 4	441.64	8,633	7,225.28	417
Total 0 to 4				2,079

Notes:

HRS Hazard Ranking System

^a From Table 3^b From Table 4

APPENDIX C
HAZARD RANKING SYSTEM SCORE SHEETS
(Nine Pages)

ATTACHMENT 1
ANALYTICAL RESULTS OF SPENT ACID SAMPLING
(One Page)

HWS TECHNOLOGIES INC.
ANALYTICAL SERVICES

Telephone (402) 475-4241

825 J Street P.O. Box 80358 Lincoln, Nebraska 68501

DATE: June 6, 1986
AUTH.: 84/3937
REPORT NO.: 86702

FOR: Lockwood Corporation
Box 160, E. Hwy #92
Gering, Nebraska 69341

ATTN: Mr. Roy Dugan

1 cc. Roy Elliott, HWS
1 cc. Gary Brandt, HWS

JOB NUMBER: 86-2005

DATE RECEIVED: 3-8-86

CLIENT/FIELD IDENTIFICATION: None Given (Galv. Waste Sulfuric Acid)

LABORATORY IDENTIFICATION NO.: 20547

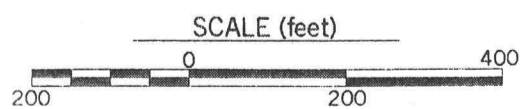
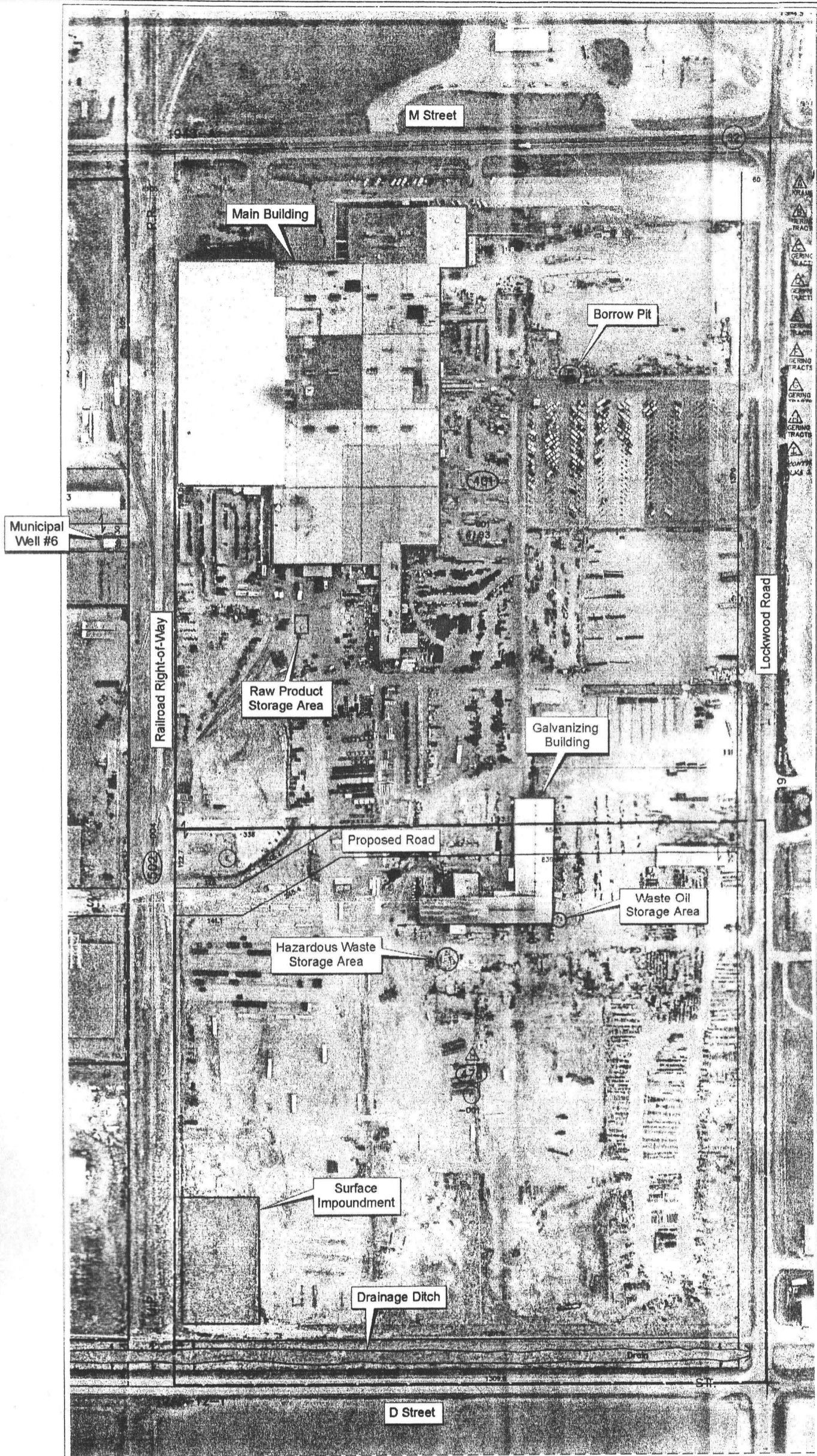
Analysis	Units	Concentration	Book/Page	Analyst
Physical Properties				
pH	S.U.	< 1	78/86013	RW
Nonfilterable Residue	mg/L	184	80/86008	RW
Metals, Total				
Cadmium	mg/L	20	10/86002	RW
Chromium	mg/L	< 0.05	12/86003	RW
Copper	mg/L	2.0	14/86001	RW
Lead	mg/L	28.0	24/86002	RW
Nickel	mg/L	1.00	23/86002	RW
Silver	mg/L	< 1	3/86001	RW
Zinc	mg/L	67,500	32/86004	RW
Organics				
Oil and Grease	mg/L	< 5	68/86006	SS

Analyses were performed in accordance with EPA 600/4-79-020, Methods for Chemical Analysis of Water and Wastes.

By

SA Smith

ATTACHMENT 2
1999 AERIAL PHOTOGRAPH
(One Page)



**Agromac-Lockwood Site
Gering, Nebraska**

TDD: S07-0011-002
PAN: 1667ALSFX
Prepared by B. Barron
November 2000

Figure 2: Site Map

ATTACHMENT 3

VOLATILE ORGANIC COMPOUND CONTOURS IN GROUNDWATER

(One Page)

John Deere Well
(JD-1)

Private Well #2
(PV-2)

SCOTTISH

OFFICE
PARKING

OFFICE
PARKING

GERING NE HWY 92

M.V. NE LV-1
[67.75]

R.F. NO. 1 [68.25]
R.F. NO. 2 [68.50]

M.V. NE LV-6

M.V. NE H-4 [70.00]
M.V. NE H-5 [68.75]
PCE-15

M.V. NE H-2 [70.25]

M.V. NE H-1

M.V. NE H-3 [70.50]

M.V. NE H-2

M.V. NE H-6 [70.75]

M.V. NE H-3 [70.75]

M.V. NE H-8 [70.50]

-30
-10
66.50

Isoconcentration Contours (ug/L)
dashed where inferred

Groundwater Elevation

Lockwood Corporation Groundwater Potentiometric Surface and PCE Concentration Contours

Date

5-7-93

Prepared By

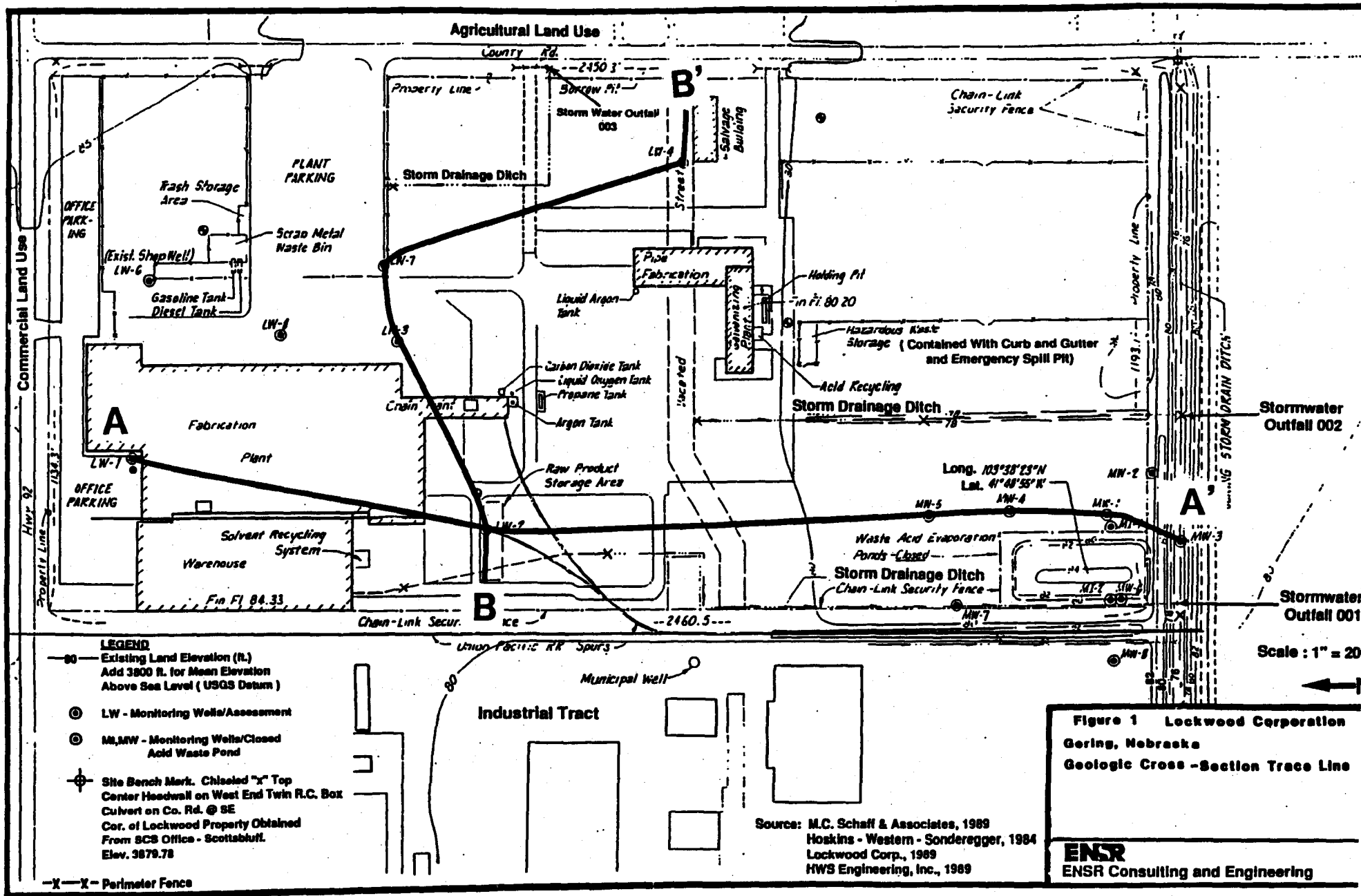
LCJ

Reviewed By

PAJ

Planning and Engineering

ATTACHMENT 4
GEOLOGIC CROSS SECTIONS OF THE SITE
(Three Pages)



ATTACHMENT5

TOTAL DISSOLVED SOLIDS IN GROUNDWATER CONTOURING

(One Page)

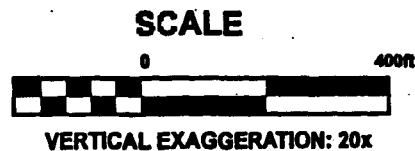
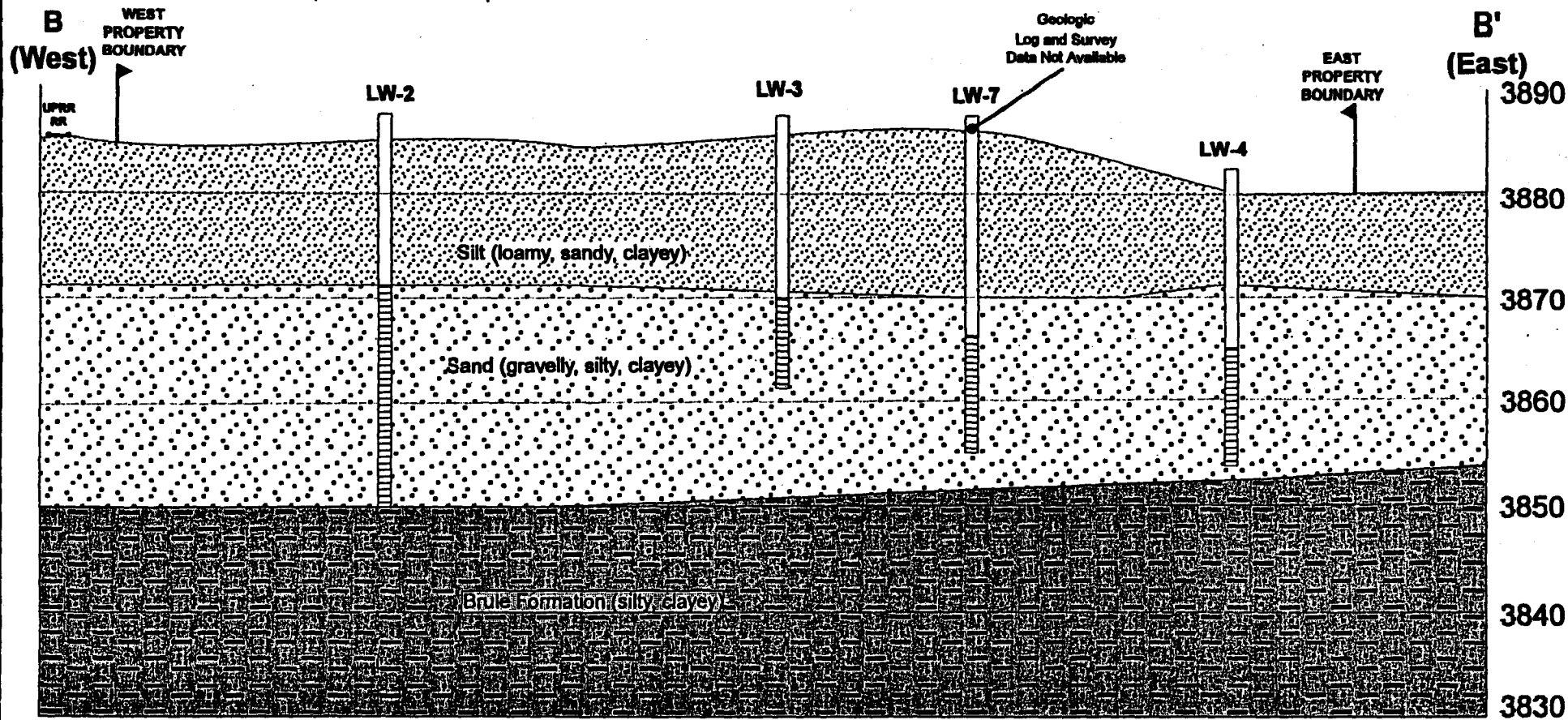
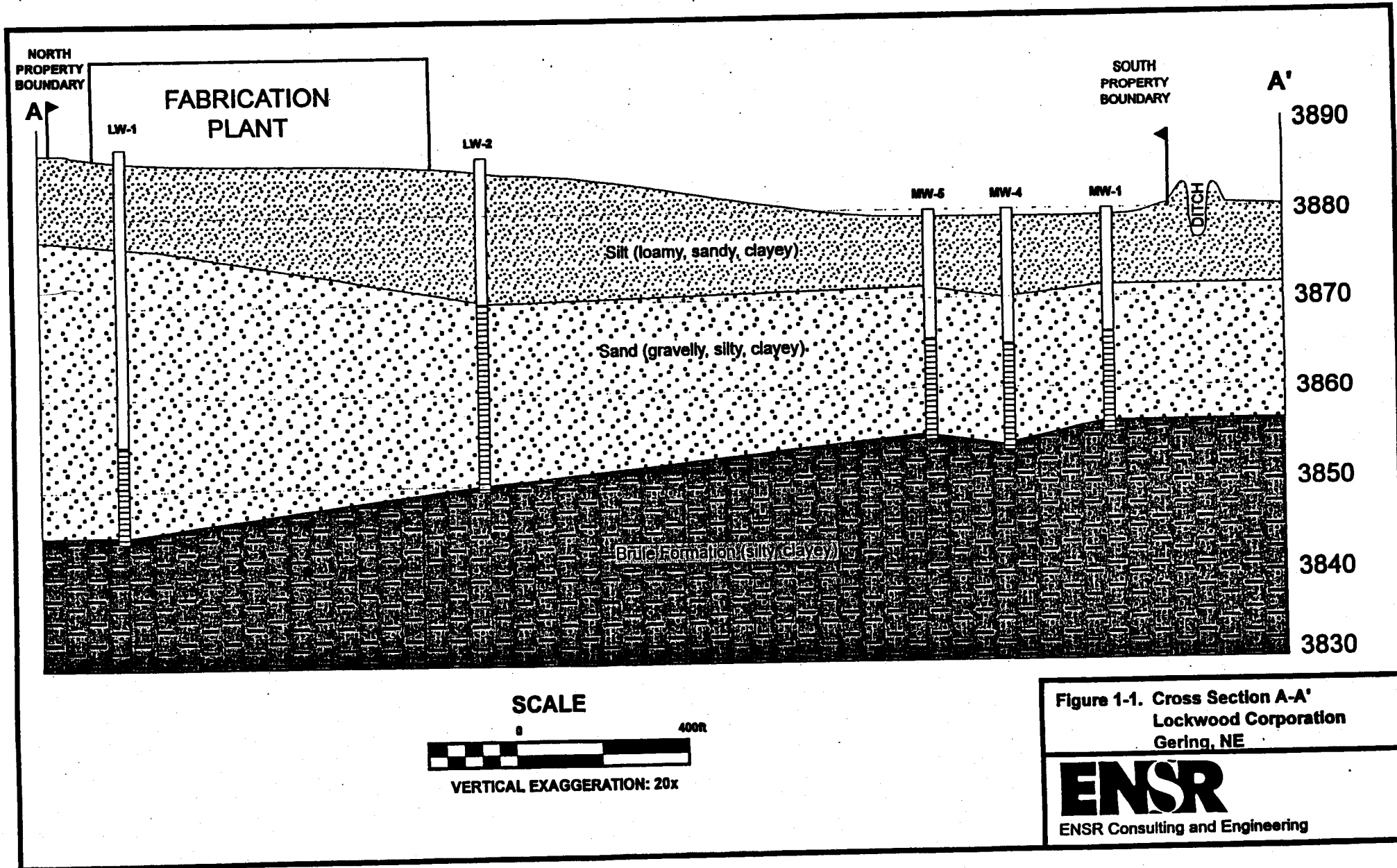


Figure 1-2. Cross Section B-B'
 Lockwood Corporation
 Gering, NE

ENSR
 ENSR Consulting and Engineering



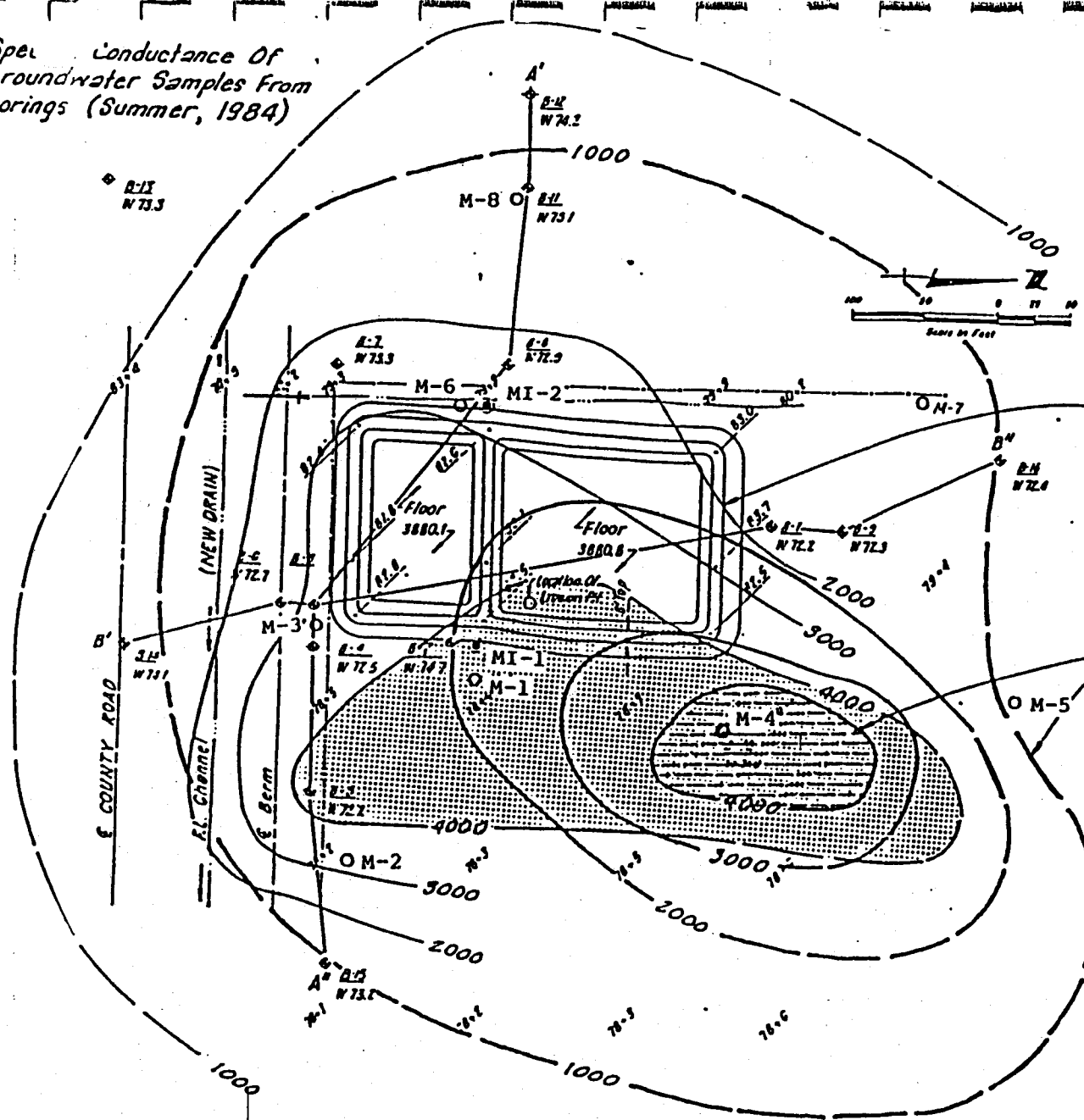
ATTACHMENT5

TOTAL DISSOLVED SOLIDS IN GROUNDWATER CONTOURING

(One Page)

Specific Conductance Of
Groundwater Samples From
Borings (Summer, 1984)

MONITORING WELL	ELEV. OF TOP OF CASING
MI-1	3880.39
MI-2	3880.42
M-1	3880.29
M-2	3880.07
M-3	3881.23
M-4	3879.68
M-5	3881.13
M-6	3880.71
M-8	3881.48



Specific Conductance Of Groundwater
Samples From Borings (Summer, 1984)
Contours Dashed Where Approximate.

Specific Conductance Of Groundwater
Samples From Monitoring Wells (April, 1986)
Contours Dashed Where Approximate

NOTE:
Specific Conductance In $\mu\text{mhos/cm}$



Zone Of Maximum
Specific Conductance

LEGEND

- ◆ B-12 Hollow Stem Auger Boring Location
- W Water Level In Boring (Elev. + 3800 Ft. - USGS Datum)
At Date Of Drilling
- ⊙ MI-1 Monitoring/Interceptor Well
- M-6 Monitoring Well
- A-A' Geologic Cross Section
- Spot Elevation Of Ground Surface
(Elev. + 3800 Ft. - USGS Datum)

FIGURE 5

ISOPLETHS OF SPECIFIC CONDUCTANCE MEASURED IN
GROUND-WATER SAMPLES DURING SUMMER 1984 AND APRIL 1986
NEAR THE SURFACE IMPOUNDMENT, LOCKWOOD CORPORATION, GERING, NEBRASKA
Source: Modified From IWS, 1986